A Review of 2001 / 2002 British Columbia Herring Fisheries

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by

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ABSTRACT

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The Pelagic Subcommittee of PSARC recommended a biological yield of 42,935 tons for five major British Columbia herring stock assessment regions in 2002. Whole herring and / or herring spawn was harvested in the following fisheries: food, social and ceremonial; roe; spawn on kelp; winter food and bait; commercial, sport, personal use bait; charity sales; zoo and aquarium food; test fishing; and research. The 2002 coast wide roe herring quota was 26,500 tons, and 27,070 tons were caught.

RÉSUMÉ

Hamer, L., P. Midgley and B. Rusch. 2002. A review of 2001 / 2002 British Columbia herring fisheries. Can. Ind. Rep. Fish. Aquat. Sci. 267: vi + 52 p

Le sous-comité pour la pêche pélagique du Comité d'examen des évaluations scientifiques du Pacifique (PSARC) a recommandé d'établir à 42,935 tonnes la productivité de cinq grandes régions de pêche au hareng de la Colombie-Britannique en 2002. Des harengs et/ou des oeufs de harengs ont été récoltés dans les secteurs de pêche suivants : pêche autochtone à buts alimentaire, social et cérémoniel; pêche des oeufs de hareng; pêche des oeufs de hareng sur varech; pêche minotière et pour les appâts; pêche commerciale, pêche sportive, pêche pour appâts à usage personnel; ventes à but caritatif; alimentation des animaux captifs (zoos et aquariums); pêche exploratoire et recherche. Le quota pancôtier de pêche au hareng rogué pour 2001 était de 26,500 tonnes, et 27,070 tonnes ont été capturées.

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1.0 INTRODUCTION

Herring have been one of the most important components of British Columbia commercial fisheries over the past century, with catch records dating from 1877. The fishery has evolved from a dry salted product in the early 1900's, to a reduction fishery in the 1930's, to the current roe fishery that began in 1972. In addition to the roe fishery, whole herring and / or herring spawn is harvested in the following fisheries: food, social and ceremonial; spawn on kelp; winter food and bait; commercial, sport, and personal use bait; charity sales; zoo and aquarium food; test fishing and research.

In this report, we briefly summarise stock assessment results and forecasts, and document allocations to all 2001 / 2002 herring fisheries. Management structures of the various herring fisheries are described, and catch information is presented. Sections detailing the dates and locations for roe herring fisheries, winter food and bait fisheries, and test fisheries are also included. Additionally, the 2002 spawn report, including dates, lengths, and widths of known spawnings by location and statistical area are presented.

2.0. STOCK ASSESSMENT

Planning for herring fisheries traditionally begins in the summer with a review of herring stock assessment information by the Pelagics Subcommittee of the Pacific Scientific Advice Review Committee (PSARC). The Pelagics Subcommittee is made up of herring research staff from the Stock Assessment Division at the Pacific Biological Station, and herring fishery managers from the Resource Management branch. Additional participants in the August 2001 Pelagic Subcommittee meeting included seven representatives from First Nations; the B.C. Ministry of Fisheries; the Herring Conservation & Research Society (HCRS); Spawn on Kelp Operators Association (SOKOA); the Sierra Club of B.C; and two industry representatives. At this meeting, an assessment of the 2001 herring abundance was made, and abundance for 2002 was forecast for the five major stock assessment regions (Figure 1).

Herring stock assessments in 2001 were made using two versions of the age-structured model (ASM) (Haist et al. 1985), and using the escapement model (EM) (Schweigert and Stocker 1988). The new versions of the age-structured model (RASM and RASM-2q) were the result of discussions from the B.C. Herring Stock Assessment Review Workshop held in Nanaimo (June 12-14, 2001). Both models utilise the available 51-year time series of catch, spawn, weight-at-age, and age-structure information. The estimated spawning escapement in each assessment region is used to forecast abundance for the next fishing season by applying average growth and survival rates to estimate the biomass of returning adults. Forecast biomass is calculated as the total of repeat spawners, plus new "recruits" (i.e. first time spawners). Three alternative stock forecasts are generated for the coming year for each assessment model using averages of the third poorest, middle third and third best of the historically observed recruitment. In general, the average recruitment forecast is adopted for the coming season unless ancillary information is available to indicate recruitment will be better or poorer than average.

The five major British Columbia herring stock assessment regions (Figure 1) are currently managed by a fixed harvest rate strategy in conjunction with fishing thresholds or "Cut-off" levels for each region. Recommended yields are set at 20 percent of the forecast biomass for each of the major assessment regions, provided the recommended yield does not reduce the biomass below the Cut-off. The 20 percent harvest rate is

considered to represent a conservative level of removals given the biological productivity of the major herring stocks (Schweigert and Ware, 1995). Cut-off levels are set at 25 percent of the estimated unfished average biomass, as determined by simulation analyses. As the forecast abundance approaches the Cut-off level, the recommended yield is calculated as the difference between the forecast abundance and the Cut-off. When the forecast falls below the Cut-off, a decision may be made to close the region to commercial fishing.

2.1. RECOMMENDED YIELD FOR 2002

The forecast biomass for 2002 for the five major stock assessment regions totalled 199,040 tonnes, or 219,400 tons[1] (Schweigert, 2001). The Pelagic Subcommittee of PSARC reviewed the forecast, and recommended a biological yield of 42,934 tons for 2002 (PSARC, 2001); (http://www.pac.dfo-mpo.gc.ca/sci/psarc/proceedings.htm). This represents a 37 percent increase from the total recommended yield of 31,416 tons in 2001.

The RASM-2q forecast of 2002 biomass was used in all areas. The recruitment assumption, corresponding 2002 pre-fishery biomass forecast, and the recommended yields for each of the major stock regions are summarised in Table 1.

In the Queen Charlotte Islands, an average recruitment option was adopted for 2002. The pre-fishery biomass forecast was 15,421 tons, assuming average recruitment, which would result in a potential harvest of 3,086 tons. However, the Subcommittee recommended the use of caution when setting a harvest level for this area.

An average recruitment option was adopted in the Prince Rupert District. The pre-fishery biomass forecast for 2002 was 37,621 tons, resulting in a potential harvest of 7,529 tons.

An average recruitment option was also used in the Central Coast, resulting in a pre-fishery biomass forecast of 27,976 tons. Application of the 20 percent harvest rate resulted in a recommended yield of 5,600 tons.

In the St. of Georgia, an "average to good" recruitment assumption was adopted, resulting in a 2002 forecast pre-fishery biomass of 113,647 tons, which allowed for a potential harvest of 22,707 tons.

Abundance in the West Coast of Vancouver Island remained depressed in 2001. Results from the 2001 offshore research cruise indicated that a poor recruitment forecast should be adopted for the WCVI area in 2002. This resulted in a forecast pre-fishery biomass of 24,736 tons allowing for a potential harvest of 4,012 tons. The Subcommittee recommended the use of caution when setting 2002 harvest levels due to the rebuilding nature of stocks in this area.

The Subcommittee could not recommend any harvest for Area 27, as the spawning biomass was estimated at only 300 tons. (For minor stocks, the yield is calculated as 10

[1] Traditionally, all estimates and forecasts listed in PSARC documents are in metric tonnes. "Short tons" (i.e. 2000 pound tons) are the measurement unit of choice for the Herring Technical Working Group, Herring Industry Advisory board, and Industry in general. For the sake of consistency throughout this document, all weights given will be in tons.

percent of the assessed 2001 abundance.) There was also no potential harvest identified for Area 2W in 2002.

3.0. MANAGEMENT PLANNING PROCESS

Operational planning for the 2002 herring roe fishery and other herring fisheries began in September with local area meetings held in Port Alberni, Courtenay and Prince Rupert and October meetings in Bella Bella and Queen Charlotte City. At these meetings, current herring stock status information and yield recommendations for 2002 were presented. Attendees were provided the opportunity to comment and advise on any issue pertaining to herring resource management in their local area. Stakeholder comments and advice obtained from these meetings were carried forward to regional advisory sessions, including the Herring Technical Working Group (HTWG) and the Herring Industry Advisory Board (HIAB) meetings, held in late September and early October.

The HTWG is made up of departmental staff augmented by a limited number of First Nations, commercial fishing industry representatives, and a representative from the BC Ministry of Fisheries. At the September meeting of the HTWG, the expected herring utilization for all non-roe herring fisheries was accounted for in an "expected use table" (Table 2). The remaining herring total allowable catch (TAC) in each of the five stock regions was then allocated to the roe fishery. The resulting roe fishery catch allocations were used in the development of a series of preliminary coastwide harvest options. In developing roe fishery options, consideration was given to advice provided by First Nations and other members of the public in prior advisory sessions. The committee also prepared recommendations for roe fishery management strategies and reviewed plans for the herring test fishery program.

All recommended management options and strategies were carried forward to subsequent meetings of the HIAB. This committee is made up of participants from twelve organisations representing all sectors of the herring fishing industry. Representatives from coastal First Nations also participated in the 2001 HIAB meetings. HIAB was tasked with developing a recommended coast-wide roe fishery option and to advise the Department of Fisheries and Oceans (DFO) on specific fishery management issues. There were two HIAB meetings held in the fall of 2001. The first meeting in late September was primarily an information session in which stock status information, roe options, and management recommendations from the HTWG were presented. Stakeholder participants were then provided a period of several weeks to consult with their constituents before reconvening at the second meeting, held in the latter part of October. At the final HIAB meeting, fishing industry and First Nation representatives shared their perspectives regarding a potential roe fishery plan for 2002. HIAB members then developed a recommended coast-wide roe fishery option for 2002, which attempted to address both the commercial fishing industry and First Nation perspectives in each stock region.

Following the HIAB meetings, draft Roe Herring and Spawn on Kelp Integrated Fisheries Management Plans were distributed to interested stakeholders and all coastal First Nations (FN) for review and comment. The management plans were finalized and carried through a regional and national review process, for approval by the Minister of Fisheries and Oceans.

A final HIAB meeting was held in May of 2002 to carry out a post-season review of the 2001 / 2002 herring fisheries.

4.0. EXPECTED USE

Expected herring use for all 2002 herring fisheries is recorded in Table 2. Expected use assignments for food, social and ceremonial uses are made first followed by expected use for other commercial fisheries and test fisheries. The roe fishery receives the available balance after other assignments are satisfied. Allotments to 'non-roe' fisheries were as follows: food, social, and ceremonial fisheries – 1,535 tons; spawn on kelp – 3,705 tons (includes 305 tons from minor areas); commercial communal fishery - 525 tons; winter food and bait fishery (including sport, commercial, and personal use bait, as well as Walcan and Fjord permits) –1,587 tons; charity sales - 150 tons; zoo and aquarium food - 110 tons; and Herring Conservation & Research Society (HCRS) for test fishing and research – 2,668 tons. Based on Pelagic Subcommittee advice, this left 32,959 tons for the roe fishery. Concerns of First Nations, as well as the PSARC advice to proceed cautiously in Queen Charlotte Islands and on the West Coast of Vancouver Island, were considered and HIAB subsequently approved a fishing plan of 26,500 tons for the 2002 roe fishery. Fisheries are planed so that the sum of catches from all herring fisheries in each area does not exceed the total allowable catch for that area.

5.0. SUMMARY OF FISHERIES

5.1. FOOD SOCIAL AND CEREMONIAL (FSC) FISHERY

A total of 1,535 tons were entered on the expected use table for food, social, and ceremonial fisheries. This can be broken down into stock assessment regions as follows: Queen Charlotte Islands – 150 tons; Prince Rupert District – 600 tons; Central Coast – 600 tons; St. of Georgia – 35 tons; west coast of Vancouver Island – 150 tons.

5.1.1. Queen Charlotte Islands

Monitoring of the First Nations (FN) spawn-on-kelp (k'aaw) fishery was conducted primarily by the Haida Fisheries Program (HFP). Fishers were requested to register with HFP and were to be monitored by aboriginal guardians as to fishing effort and harvest. DFO management personnel conducting stock assessments, and Conservation & Protection personnel conducting enforcement activities, were also tasked with monitoring the FN spawn-on-kelp fishery during the 2002 season.

Haida food harvesters were present in Jedway Bay, Burnaby Strait and Selwyn Inlet in 2002. Food harvesters normally obtain most food product from Selwyn Inlet during the month of April. However, in 2002 this opportunity was unavailable due to a lack of spawn in Selwyn Inlet area and there was limited harvest success overall as a result. While the Haida Fisheries Program did not provide DFO with any harvest numbers, DFO managers estimate the amount of product harvested in 2002 to be less than 3,000 pounds.

5.1.2. Prince Rupert District

DFO currently has no agreement with the Tsimshian Tribal Council, and has not received any FSC catch information. It is known that there was some product harvested in the area of North Porcher Island, and trimmings were available from spawn on kelp ponds. Trimmings from spawn on kelp ponds, as well as spawn on vegetation and boughs were harvested in Kitkatla.

5.1.3. Central Coast

The Kitasoo FSC records indicate that approximately 3,000 pounds of spawn on branches was harvested in 2002.

The Heltsiuk Fisheries Program issued 291 licenses for SOK harvest under communal license. Survey results indicate the Heiltsuk harvested approximately 362,000 lbs. of herring spawn for FSC purposes in 2002.

The Oweekeno were reported to have received approximately 700 lbs. of SOK trimmings from the Oweekeno / Nuxalk J license and a further 150 lbs. of SOK and 50 lbs. of spawn on branches for members living in Port Hardy. The Nuxalk are reported to have received approximately 50 lbs. of product from the Oweekeno / Nuxalk J license and a further 500 lbs. of SOK from Heiltsuk members.

The Gwa'sala-Nakwaxda'xw reported to have not received any SOK food product in the community in 2002.

5.1.4. Strait of Georgia

While tentative food fish plans were discussed with South Island First Nations, the interest in roe herring food fish was not as predominant in 2002 compared to 2001. First Nations, other than those represented through South Coast Intertribal Fisheries (SCIF), did not express any concrete plans to fish for food fish other than to indicate in a general way that options were being explored.

The First Nations that did participate in herring FSC fisheries were as follows:

SCIF PARTICIPANTS	INDEPENDENTS
Cowichan	Saanich Tribal Fisheries (Tsawout, Tsartlip, and Paquichan)
Chemainus	
Halalt	Nanaimo
Lyackson	
Penelakut	

The SCIF participants fished for approximately 4 hours on March 17, 2002 prior to the commercial gillnet opening. Fishing was conducted from one gillnet punt, and 6 tons of herring were harvested. The herring was immediately transported to French Creek and delivered to waiting trucks for distribution.

Saanich Tribal Fisheries harvested 3 tons of herring by gillnet prior to the opening of the commercial gillnet fishery. This fishery occurred near Chrome Island on March 15.

The Nanaimo First Nation attempted to harvest food fish in Baynes Sound during the week of March 25. Arrangements had been made with a shrimp trawler to harvest the herring. The Department was concerned that this could pose a potential habitat issue and would be an ineffective way to harvest herring. Nanaimo proceeded with the fishery and reported that the shrimp trawler was not able to harvest any herring. On April 8 and 9, Nanaimo First Nation members fished off Shell Beach (near Coffin Point), and harvested 2 tons of herring by gillnet.

In addition to these groups, the Klahoose and Cowichan First Nations also harvested spawn on boughs.

Both Atlegay Fisheries and the Qualicum First Nation did not harvest FSC herring in 2002.

The 2002 FSC herring fishery in the St. of Georgia harvested approximately 11 tons of whole herring and 1 ton of spawn on boughs.

5.1.5. West Coast of Vancouver Island

Barkley Sound: Whole herring were provided to First Nations by the test vessel operating in Area 23 and considerable quantities of spawn on boughs were collected by March 28 from the Stopper Islands area. Toquaht received herring and SOK trimmings from their commercial operations and some SOK trimmings were given to Huu-ay-aht and other First Nations in the area.

Clayquot Sound: The test vessel in Area 24 provided small quantities of herring to the three Clayquot Sound First Nations and the spawn on kelp operation may have provided additional herring. Ahousaht and Hesquiaht members placed trees and branches in the spawn at Baseball Bay, and an unknown quantity of spawn was harvested. Ahousaht received (unconfirmed) 3 totes of low-grade spawn on kelp for local use from their commercial pond in Young Bay, as well as about 1,300 lbs. of trimmings from the closed ponds in Young Bay and open ponds in Baseball Bay.

Nootka / Esperanza: Test vessels working in the area supplied small quantities of herring to Nuchatlaht, Ehattesaht and Mowachaht members. Two large totes of herring from test payment unloaded at Zeballos were also provided to Nuchatlaht (of which some was given to Ehattesaht). Trees were set in Inner Nuchatlitz, at the head of Rosa Harbour and although some of the trees examined before harvesting showed good coverage of spawn, no estimate of the quantity harvested was obtained. Surplus spawn on kelp and trimmings were obtained from the commercial operations of the two Esperanza-based First Nations, as well as by Kyuquot and Mowachaht SOK licences.

Kyuquot: There was a significant spawn in Clanninick Cove this year but only a very small amount of spawn on vegetation was reported to have been harvested. The Kyuquot First Nation obtained product through their commercial spawn on kelp operation in Esperanza.

Quatsino: The Quatsino First Nation harvested some herring by gillnet just outside Winter Harbour and obtained surplus spawn on kelp from the commercial open pond operation inside Winter Harbour.

Final tallies made from the available information indicate that 118,600 pounds of whole herring, 8,850 pounds of spawn on boughs, and 6,410 pounds of spawn on kelp were utilized for FSC on the West Coast of Vancouver Island.[2]

5.2. ROE FISHERY

The commercial roe herring fisheries traditionally occur in some or all of five geographic areas that correspond to the major stock assessment regions (Figure 1). Within each of these areas, the usual practice has been to schedule different fisheries for gillnets and seines, so the entire quota within any of the five areas is rarely taken from a single site. The location and timing of fisheries is based on operational considerations, including the suitability of the fish (i.e. size and roe maturity), and accessibility to the fleet. Fishing generally takes place in late February to early March in southern BC, and mid-March to mid-April in northern BC. Opening dates and times for the commercial fishery are announced on the fishing grounds as the roe matures to optimum quality. Specific

[2] The data provided for the West Coast of Vancouver Island is incomplete, and only contains information received or observed by DFO personnel or contractors.

fishing locations are determined by major concentrations of fish and the potential for the highest roe yield.

A limited entry personal herring seine (HS) or a herring gillnet (HG) license is required to participate in the roe herring fishery. At this time, there are 252 seine licenses and 1277 gillnet licenses eligible to participate in the roe herring fishery. The actual number of active licences varies from year to year due licence retirement requirements for vessels participating in the test fishing program (see Section 5.7), and retirement requirements of 10 First Nations spawn on kelp licences (see section 5.3).

In the past, roe herring fisheries were characterised by short intense fisheries, in which the fleet fished to the overall area quota, not to individual licence quotas. This type of fishery often exceeded area quotas due to the high capacity of the fleet to catch fish and the limited ability to obtain accurate and timely catch estimates.

To practise more risk averse management techniques, the roe herring fishery is currently managed under a pool fishery system. In 2002, license holders were required to pool a minimum of eight seine licenses or four gillnet licenses in order to fish. There was no maximum number of licenses in a pool. Each pool fished independently until their quota was caught. If a pool catches more than their quota, the overages were disbursed in the following priority: given to other pools of the same gear type fishing in the same area; used by test boats of the same gear type working in the area (when feasible); or relinquished to the Herring Conservation and Research Society. Overages caught by a pool in one management area could not be transferred to a pool with an underage in another management area. Additionally, overages could not be transferred between gear types. All 2002 catches (seine, gillnet, and test), were validated at the point of landing by industry funded, designated validators hired through J.O. Thomas & Associates Ltd.

The commercial roe herring fishery is traditionally allocated approximately 75-80% of the PSARC recommended allowable catch. The 2002 roe quota of 26,500 tons was 62% of the PSARC recommended allowable catch and represented 73 % of the total expected catch for all herring fisheries. (The 2002 quota was up from the 2001 quota of 23,876 tons.) The roe quota was split between the seine and gillnet gear sectors, with the seine sector receiving 55% (14,575 tons), and gillnets receiving 45% (11,925 tons). Total roe herring catch for all areas was 27,070 tons (14,882 tons caught by seine and 12,188 tons caught by gillnet). Information on quotas, catch, opening dates, and open areas can be found in the fishery notice in Table 3. Additional information on seine and gillnet quotas, catches, and number of licenses by license area are presented in Table 4.

All known spawnings in 2002 are presented by location, statistical area, date and survey method (i.e. surface or dive) in Table 5. The spawn area index, or SAI provides an index of abundance and is calculated by multiplying the length and width of the spawn by the percent of the area covered with eggs by the average number of egg layers.

5.2.1. Queen Charlotte Islands

Seine fishery: PSARC had predicted a pre-fishery biomass in excess of 15,000 tons, which could have resulted in a potential roe herring harvest of just over 1,500 tons. HIAB approved a conservative 500 ton seine fishery, and an additional 296 tons of test fish to be harvested for the 2002 season.

Prior to the start of the roe herring season, industry was advised that no pre-fishery notice would be provided for the seine fishery in the Queen Charlotte Islands. The

understanding was that with only one pool of eight licences operating to catch the 500 ton allocation, industry representatives could decide when to relocate to the fishing grounds. On March 11, a good test set was made in Burnaby Strait (10.7% roe yield; 14% under the cutoff length of 19 cm). All licensed vessels were present by March 16.

Throughout the period of March 16 to March 20, a strong NE wind developed which brought very cold temperatures and snow. There was the potential for an earlier harvest but weather did not allow for a safe fishery, or sea conditions that would allow transport of product without damaging it. By March 21, the wind settled and conditions improved to allow for a fishery. Juan Perez Sound (Areas 2-12 and 2-13) opened to seines at 06:30 hrs (Figure 2).

At the start of the fishery, licensed vessels had located fish holding just east of Kat Island in Burnaby Strait. The first set had to be let go due to a Haida protest vessel getting seine web caught in its propeller while attempting to throw sea lion bombs into the set. Three additional sets were allowed, and by mid morning the decision was made that no further sets would be considered until pumping was complete. At 16:30 hrs the hailed catch indicated all pool fish had been caught. Area 2 East was closed to roe herring fishing on March 22, at 14:20 hrs.

Gillnet fishery: There was no roe herring gillnet fishery in the QCI in 2002.

5.2.2. Prince Rupert District

Seine fishery: The Prince Rupert area seine target catch was 2000 tons and the anticipated fishing location was Kitkatla Inlet. Thirty-three (33) licensed seines elected to fish the area, for a per license share of 60.6 tons.

Stocks in Kitkatla Inlet reached 10 percent roe maturity on March 21, at which time the fish moved into the Wilcox / Clamshell Islands area and held at the top end of Gurd Island. In the days following, no significant stocks were located elsewhere in the inlet. On March 28, spot spawns were observed at the top of Gurd Island. Over the next few days, these stocks moved over the Robert Island bar and commenced spawning in Gurd Inlet.

Both Willis Bay and Kitkatla Inlet were considered as fishing options, and assessments continued throughout the season as stocks reached maturity levels above 10%. A 13% roe test was obtained on 2000 tons in the Willis Bay area on April 1. Although the roe maturity appeared acceptable, industry representatives opted to obtain further samples in hopes of finding larger fish.

On April 02 a test set was made at the bottom end of Gurd Island, with only 10 percent roe yield, and an average of 8 spawned out fish in the tests. Spawned out fish were also present on the west side of Gurd Island.

On April 03 assessments in Kitkatla Inlet located only spawned out fish and juveniles. However, a body of fish with acceptable roe quality was located off the Prager Islands and Areas 5-10 and 5-11 (Figure 3) opened from 11:45 hrs until 21:00 hrs. All sets were sampled prior to drying up. The validated catch from this first day of fishing was 728 tons.

Areas 5-10 and 5-11 re-opened on April 04 at 05:30 hrs and assessments continued in the Inlet. Three sets made on the west side of Gurd Island each contained a large percentage of spawned out fish, due to spawning which continued in Gurd Inlet. In total,

14 sets were made in the Willis Bay area, however, no fish were retained as sets only contained small fish or were water hauls. The fishery closed at 14:00 hrs and following discussions with pool captains, it was decided to stand the fleet down for the day and continue assessments the following day. Assessments were conducted using the DFO vessel, two test fishing vessels, and 12 industry vessels, such that if things were to change on short notice there would be enough boats in the area to initiate a fishery. The remainder of the fleet relocated to Prince Rupert.

On the morning of April 05 assessment vessels located what appeared to be new fish in the Gravel Pit area and off Viscount Point in Willis Bay. Spawned out fish were still present on the west side of Gurd Island, but active spawning had ceased. Acceptable fish were found in sets made in the Gravel Pit and at Willis Bay, and Areas 5-10, 5-11, and a portion of 5-4 opened to roe herring seine fishing at 09:14 hrs. The fishery was slow throughout the day with many water hauls as fish remained in the shallows and in the Clamshell Islands area. The area closed at 20:00 hrs with a hailed catch for the day of 677 tons.

The fishery re-opened for the fourth and final day on April 06 at 06:15 hrs in Areas 5-10, 5-11, and a portion of 5-4 (the West Side of Gurd Island). The main activity was in sub-area 5-4. Five sets in the Inlet resulted in a (hailed) catch of 475 tons. The test fishing vessels *Ocean Horizon* and *Ocean Venture* made the last sets for the fishery, catching an additional 115 tons. The area closed at 15:30 hrs, with a total hailed catch of 1995 tons. The final validated catch was 2059 tons, of which 1050 tons were harvested in the Willis Bay / Prager Islands area. Roe quality for the fishery ranged from 10 to 13 percent.

Gillnet fishery: Two hundred and thirteen (213) licenses were issued for the 2600 ton area 3 / 4 gillnet fishery.

Herring migration in 2002 followed a very similar pattern to the last several years. Early in the season, stocks held in 60 to 70 fathoms of water outside of Finlayson Island and Big Bay. As the season progressed the fish moved as far south as Tugwell Island and the north end of Digby Island, and gradually moved into shallower water. Before the start of spawning, the fish moved northward again. The first spawn started March 24 at Tree Bluff and then extended northward into Big Bay and southward to Slippery Rock.

On the morning of the March 25, the spawn in the Tree Bluff / Slippery Rock area was in excess of a mile with a good showing of fish in the shallows. In addition, a small spawn continued at Simpson Point. Gillnet advisors and pool captains were asked if they wanted to fish or wait, and while responses were mixed, the decision was made to begin the fishery. The fishery started slowly at 14:00 hrs, with approximately 34 punts arriving on the grounds. Most of the fleet fished just north of Tree Bluff and near Simpson Point where they could avoid the worst of the weather. Some areas initially had high male counts but improved as the fishery progressed. By evening 300 to 400 tons had been taken in the fishery.

The following day, March 26, the wind changed to southwest gales. The fleet had risen to approximately 46 punts, twenty three of which were operating in the Simpson Point / Salmon Bight area and the rest were scattered southward as far as Slippery Rock. By the evening, approximately 1350 tons had been taken. The following morning, March 27, the catch was estimated at 1500 tons and increased to 1970 tons by the evening. The punt count was approximately 36 with some pools having finished and leaving the grounds. By March 28, the punt count was down to 20 and the spawn had progressed

to the north shore of Big Bay with the remaining fleet slowly moving in that direction. By the evening, the catch was estimated at 2530 tons.

By the following morning, one pool remained and the fishery closed on March 29 at 17:00 hrs after being open for 99 hours.

5.2.3. Central Coast

Seine Fishery: The Central Coast seine fishery had a target catch of 2633 tons. Fifty-five (55) licenses, organized into 5 pools, chose to fish in this area. The per license share was 47.87 tons.

An advisory meeting with industry, pool captains and charter vessel captains was held at Shearwater on March 23. There was agreement that assessment for a fishery would focus on the Seaforth / Spiller Channel and East Higgins Pass areas. Both of these areas showed a significant tonnage of herring sounded, with an average size of over 20 cm in East Higgins Pass and 19.6 cm in Seaforth / Spiller Channel. Both areas also have the least amount of resource use conflicts.

Seaforth / Spiller Channel was recognised as the most preferred option because of the success of past fisheries in this area, and because of the tendency for fish to disappear or move into unfishable water in East Higgins Pass.

On March 25, fish caught in test sets at Locke Island and Mosquito Bay were considered acceptable, but fish tested at Neekas were quite small. On March 26, small spot spawns were reported at the head of Powell Anchorage and in Dundivan Inlet.

The seine roe herring fishery opened in the Spiller Channel / Seaforth Channel areas (Area 7-13, and portions of 7-14 and 7-15 (Figure 4)) at 06:00 hrs on March 27. After consultation with pool captains and industry representatives the fishery closed for the evening at 19:30 hrs. By 22:00 hrs, two pools had reported they had attained their quotas and were leaving the grounds. A total catch of 1,553 tons was hailed for March 27.

The seine fishery re-opened in the same areas as the previous day at 05:30 hrs on March 28. By 12:00 hrs fishing had slowed considerably and industry was concerned they would be unable to attain their quotas in the Seaforth / Spiller Channel area. Industry and Fisheries consulted and the decision was made to select a few vessels from each pool and harvest a portion of the remaining pool quota in East Higgins Pass.

East Higgins Pass, Area 7-3 (Figure 4), opened to seines at 16:20 hrs on March 28. The fishery closed for the evening at 21:05 hours in both the Spiller Channel / Seaforth Channel and the East Higgins Pass areas. Hailed catch for March 28 was 643 tons, which included 92 tons caught at East Higgins Pass.

The seine roe herring fishery re-opened in the Spiller Channel / Seaforth Channel and East Higgins Pass areas at 05:30 hrs on March 29, and closed at 12:05 hrs. Hailed catch for March 29 was 249 tons.

The Central Coast seine fishery was open for 35.5 hours. Total hailed catch for the fishery was 2,445 tons. The final validated catch was 2,636 tons, representing an overage of 3 tons.

Gillnet Fishery: Forty-eight (48) gillnet licenses formed 8 pools to catch the 450 ton Central Coast gillnet quota. This worked out to a per license share of 9.375 tons.

The first spawn in East Higgins Pass was recorded on March 31, and the last recorded spawn was on April 9. Gillnet test sets made at the entrance to South Lagoon in E. Higgins Pass on April 1 and 2 were 13.2% and 12.6%, respectively. On the morning of April 2, there was active spawn both north and south of the entrance to South Lagoon.

The Central Coast gillnet fishery opened on April 2 at 10:00 hrs in East Higgins Pass, a portion of sub area 6-16 south of the line from Wilby Point to Lombard Point, sub area 6-17 and that portion of sub area 7-3 west of the line from Jorkins Point to Aldrich Point (Figure 4). By 1300 hrs all pools were fishing with 25 nets in the water and fishing was reported as very light. By the evening of April 3, 5 of the 8 pools had taken their quotas, and left the grounds. Hailed catch was 310 tons for April 2, and 85 tons for April 3.

Spawn activity in the East Higgins Pass area had slowed considerably by the morning of April 4. Two of the 3 remaining pools opted to look at the Mathieson Channel area for the balance of their quota while the other pool kept fishing and attained their quota in East Higgins Pass.

The gillnet fishery closed in East Higgins Pass at 11:00 hrs on April 4, and reopened in Mathieson Channel (portion of sub area 7-9) at 14:30 hrs for the 2 remaining pools. The fishery closed at 06:30 hrs on April 5, with the 2 pools not attaining their quotas. Both pools had equipment problems at the start of the fishery.

The Central Coast gillnet fishery was open for a total of 68.5 hours. Catch weighed on the grounds totalled 439 tons, and 439 tons were validated at the dock.

5.2.4. Strait of Georgia

Seine Fishery: The seine quota for the St. of Georgia was 9,442 tons. One hundred forty-four (144) seine licenses chose to fish this area, organised into 8 pools. The average catch share per license was 65.6 tons.

Test fishing vessels working in late February found substantial bodies of fish around Northwest Bay, all along the Qualicum shoreline in the deep, and off Norris Rocks. There were also 20,000 tons located south of Dodd's Narrows, and as well as 7,000 tons in Saanich Inlet. By February 28, soundings had increased to approximately 100,000 tons. The main bodies of fish were generally holding offshore in deep water, which caused difficulties in obtaining representative test samples. The presence of large numbers of sea lions also contributed to the problem of getting representative samples.

A seine advisors meeting was held on March 5, to review fishing plan details and pool captain responsibilities. On March 6, an estimated 8,000 tons of fish had moved into Upper Baynes Sound (outside of Comox Harbour). The fish were tested at 12.3% to 13% roe yield. Industry representatives were satisfied with the quality, and recommended opening the fishery the next day.

The seine fishery opened at 08:30 hrs on the morning of March 7, in Upper Baynes Sound, Areas 14-11 and portions of 14-14 and 14-15 (Figure 5). At opening time 32 first setters were identified to proceed, and additional sets progressed throughout the day. The fishery closed for the day at 21:30 hrs, with an advisory to the fleet that there would

be an update at 07:00 hrs the next morning. A total of 132 sets were made on this day, for a hailed catch of 8,953 tons.

On the morning of March 8, an industry meeting was held with the 4 pools that were still short of their target. Agreement was reached that one seine test vessel and one industry vessel would set in order to achieve the fishery target and catch the remaining test fishing payment requirement. The goal at this time was to harvest a total of 425 tons. The area re-opened at 08:37 hrs to allow the industry vessel to set. A total of 3 sets were made, and after the third set was completed it was clear that the target catch had been achieved. The fishery closed at 19:00 hrs.

The target catch for this fishery was 9,442 tons; hailed catch was 9,334 tons; and landed validated catch was 9,685 tons, which was 243 tons over the quota.

Gillnet Fishery: Nine hundred and twenty-two (922) gillnet licenses, organised into 15 pools, chose to fish in the 8,375 ton St. of Georgia gillnet fishery, for a per license share of 9.08 tons.

A gillnet advisors meeting was held in Nanaimo on February 27. The gillnet fishing plan, gillnet pool captain responsibilities and the First Nations fishing plan were discussed.

The gillnet fishery commenced at 13:00 hrs on March 17 in Subareas 14-1 to 14-13, 14-15, 17-12, 17-18, 17-19 and 17-21 (Figure 5). At opening, a total of 185 skiffs operated with the majority of the fleet fishing in the area between Parksville and Columbia Beach. Catch by 18:00 hrs was estimated at 2,000 tons.

Cold and stormy conditions overnight caused the fleet to stop fishing. Strong winds continued throughout the day and catch for March 18 was extremely limited as most pools had stopped fishing completely.

The weather improved on March 19 and fishing re-commenced for all pools. Spawning had almost stopped in the French Creek and Parksville area, and the majority of the fleet was concentrated in the Cape Lazo area, although some skiffs continued fishing in the Northwest Bay, Nuttal Bay and the Lantzville areas. By the evening of March 19, catch was estimated at 6,650 tons.

By 08:30 hrs on March 20, 5 pools had attained their quota, leaving 10 pools with 50 to 55 skiffs still fishing. Catch at this time was estimated at 7,700 tons. At 12:00 hrs, the announcement was made that the fishery would close at 16:00, as it was expected the quota would be attained. The hailed catch at the end of the fishery was 8,501 tons, and the validated catch was 8,639.6 tons. This represented an overage of 264.6 tons.

5.2.5. West Coast of Vancouver Island

Seine Fishery: There was no roe herring seine fishery the WCVI area in 2002.

Gillnet Fishery: Sixty-three (63) gillnet licenses formed 4 pools to catch the 500 ton Esperanza gillnet quota. This worked out to a per license share of 7.936 tons.

Initial soundings on February 26 reported between 3,000 – 5,000 tons of herring in Esperanza Inlet. As the sounding and test fishing program continued, a maximum estimate of 13,000 – 15,000 tons of herring was sounded on March 17. Throughout the assessment period, the main body of fish remained in Esperanza Inlet between Centre

Island and Black Rock, several small schools were observed as far as 2 miles east of Garden Point on March 15.

Two advisors meetings were held on March 8 and March 25. The first meeting was poorly attended by gillnet fishermen, with only one pool represented. Two SOK open pond operators attended and due to the lack of gillnet representatives, the focus of the meeting was on the SOK operations. The main issue for open pond SOK operators was the request that an area of beach be closed to gill netting to protect the quality of their product. The second meeting was attended by representatives from three of the four pools. The main issued raised was the size of the area requested for exclusion from the gillnet fishery requested by the SOK operators. All parties agreed to wait until the main spawn developed and then see if this issue remained. Areas to be avoided to protect aboriginal fishing gear were also discussed.

The first spawn occurred on March 25 east and west of Owossitsa Creek (the location of the SOK open ponds). This first spawn did not have any backup. On March 26 a major spawn started in Inner Nuchatlitz seaward of the Oil Tanks and spread over the next 24 hours towards Ensanada Islet. The spawn was very intense and concentrated on March 26.

After inspecting the spawn and conducting several roe tests, two pools requested a 09:00 hrs opening. The fleet was given notice of the opening and the fishery commenced at 09:00 hrs, March 26 in Area 25-13 (Figure 6). Initially 5 skiffs and 11 nets operated just seaward of the Oil Tanks. Within several hours, 12 skiffs were operating with approximately 24 nets. Fishing was very good during the first 15 hours of the fishery with all skiffs experiencing very heavy fishing. One operator reported that he caught 18 tons on his first 3 shakes. Fishing slowed into the evening and by the morning of March 27 the fishing had slowed considerably.

Two pools caught their quotas by 10:00 hours on March 27. As the fishing slowed, nets were moved near Rosa Harbour and towards Ensanada Islets. By March 28, fishing was very slow with only spot-spawns remaining. One pool stopped fishing at 11:30 hrs and departed for Zeballos to offload. The remaining pool fished until 13:00 hrs and the fishery closed at 16:00 hrs on March 28.

The quota for the Esperanza gill net fishery was 500 tons and the validated weight landed was 427.988 tons. The inability of the fleet to harvest the quota was a result of insufficient harvesting and packing capacity affected by:

- fishermen holding licences in several areas and having to split resources
- mechanical problems
- time required for packers to offload and return to grounds
- short intense spawn period
- weather
- late spawning date

5.3. SPAWN ON KELP FISHERY

Spawn on kelp (SOK) fisheries generally take place in March and April, with fisheries progressing in-season from south to north. In some years, fishing will persist into May and June in more northerly locations. The fishery generally is carried out at specific

locations where there are adequate herring spawns, and lend themselves to herring ponding operations.

The 2002 commercial SOK fishery occurred in 4 of 5 geographic areas corresponding to the major stock assessment regions (Figure 1): Queen Charlotte Islands (Area 2E); Prince Rupert (Areas 3,4,5); Central Coast (Areas 6,7,8); and West Coast of Vancouver Island (Areas 23, 24, 25). In addition, some licences operated in locations supporting minor herring stocks, including Quatsino Sound (Area 27), Johnstone St. (Area 12), and Smiths Inlet (Area 10). The restricted management regime that was in effect for the Queen Charlotte Islands and the West Coast of Vancouver Island in 2001 was removed in all areas except in Area 27 on the WCVI. Two licences were temporally relocated from Area 27 to Area 25 due to stock concerns.

During the annual herring planning process, herring was set-aside from the TAC for the spawn on kelp fisheries. This allotment is to allow for the average per-license production of 8 tons of spawn on kelp product. Mortality and egg loss is considered in the formula used to calculate the set-aside of 100 tons of herring per closed pond operation and 35 tons per open pond. In 2002, 1000 tons of herring were set aside in the Prince Rupert and QCI areas, 600 tons in the Central Coast, 200 tons in the Gulf and 600 tons in the WCVI area. An additional 305 tons were set aside from the minor stock assessment areas and 525 tons were set aside in the Central Coast for FN commercial communal spawn on kelp fisheries. This set-aside allowed for a 2002 commercial spawn on kelp coastwide quota of 417.4 tons of product.

Forty-six (46) category "J" licenses were issued to harvest herring spawn on kelp in 2002. The majority of licence holders in this fishery are First Nation individuals or tribal groups (37 of 46 licences). Individual quotas (IQ) are specified on each licence. In 2002, individual quotas were based on eight tons of drained product and subject to the quota carry over provisions. Exceptions to the eight ton catch allocation exist for Native band licences which have not met roe herring licence retirement provisions[3], and for three Heltsiuk licenses (FJ-1, FJ-39, and FJ-41) which have a quota of 24 tons (48,000 lbs.) each.

A quota carry-over program introduced in 1996 was continued in 2002. This program allows spawn on kelp licence holders to carry over reasonable IQ overages or underages, from one year to the next. The rules for carry over are as follows:

- Licence holders whose product weight at the end of the season is under the IQ by 2000 lbs. or less will have the equivalent weight of the underage added to their IQ in the following year.
- Licence holders whose product weight at the end of the season is under the IQ by more than 2000 lbs. will have 2000 lbs. added to their IQ in the following year and will forego the remainder.
- Licence holders whose product weight at the end of the season is over the IQ by as much as 1000 lbs. may retain the overage, and the equivalent weight of the overage will be subtracted from the licence holder's IQ in the following year.
- Licence holders whose product weight at the end of the season is over the IQ by more than 1000 lbs. may retain 1000 lbs. of the overage, and must relinquish the

[3] The 10 FN band licenses introduced in 1991 and 1992 are each required to designate 4 gillnet licenses as inactive in a given year, unless they have permanently retired the licenses. If a license does not retire all 4 licenses, their SOK quota is prorated.

remainder. Further, the weight of the total overage will be subtracted from the licence holder's IQ in the following year.

The weight of the spawn on kelp product to be applied against an IQ is the total drained weight of spawn on kelp product validated at the landing port. A salt allowance, equal to 5% of the total drained weight, is applied to compensate for salt and entrained water (i.e., the total validated weight will equal the drained weight minus 5% of the drained weight).

The transfer of SOK product between licence holders operating in different stock assessment regions is not allowed. Spawn on kelp product can be transferred on-grounds between licence holders in the same stock assessment region. In-plant transfers of product between licence holders from the same stock assessment area can be carried out subject to the prior approval of a Fisheries and Oceans representative.

The Spawn on Kelp Monitoring Program (SOKMP) funded by the Spawn on Kelp Operators Association (SOKOA) was introduced in 1996 and continued for the seventh consecutive year in 2002. The objectives of this program are to monitor aspects of the fishery using on-ground monitors and port validators. On-ground monitors document fishing and harvest activities of each SOK operation. Port validators validate the landed harvest with records from the on-ground monitor and record final landed weights. Port validators also monitor in-plant transfers of both processed and unprocessed product between licenses and audit the utilisation of J-license export buckets and bucket decals during processing.

On-ground monitor coverage and in plant validation was provided by the SOKMP for all operations except the Heiltsuk communal commercial licenses in Area 7. In 2001, the SOKOA withdrew monitoring services when monitoring requirements inconsistent with the rest of the fishery were approved for the Heiltsuk. Therefore, as in 2001, the Heiltsuk Fisheries Management, DFO Resource Management and C&P Staff provided a separate monitoring program for these licenses.

The Heiltsuk SOK fishery was monitored and validated jointly by the Heiltsuk Fisheries Management, DFO Fish Management and C&P staff. C&P staff monitored and recorded kelp harvest, open line locations and harvesting. The number of lines, length and location were recorded as well as the participants and vessels being used. DFO Fish Management staff worked with the Heiltsuk Guardians to conduct on grounds observations and data gathering. Plant validation of the SOK product was conducted jointly by a validator, hired by the Heiltsuk Band and C&P staff. The validator and two C&P staff were at the processing plant for all deliveries and validation activities. The processing plant staff, the validator and the C&P staff all worked jointly to control the quantity of deliveries to the plant in order to not validate SOK product in excess of the quota and overage clause. SOK product harvested under the FJ licences but not delivered to the Bella Bella plant due to achieving the quota were used as FSC SOK.

One on-grounds monitor assignment in the Queen Charlotte Islands covered operations of the 10 licenses designated to Area 2E between March 17 and April 9, 2002. Early season operations in Louscoone Inlet were not covered on grounds by the SOKMP.

Two assignments in the Prince Rupert District covered 10 J license operations in Area 4 at Big Bay, Pearl Harbour and Island Point, and in Area 5 at Gurd Island. Monitors were on the grounds for all fishing and harvesting operations in this area, which occurred between March 20 and April 20 in Area 4 and March 25 and April 23 in Area 5.

In the Central Coast 19 licenses operated of which, three pooled licences were located in Area 6, nine Heiltsuk licences operated in Area 7, two licenses in Area 8, three in Area 10 and one in Area 12. Three on-grounds assignments provided under the SOKMP monitored the operations ten licenses in Areas 6, 7, 8, 10 and 12. Two Fishery Officers, Fisheries Management staff and a validator hired jointly by the Heiltsuk Band and DFO monitored operations of the nine Heiltsuk licences in Area 7.

Two assignments were set for the West Coast of Vancouver Island to cover the operation of seven SOK licences. One assignment covered one open pond operation in Area 27 from on board the seine test fishing vessel working in the area. One assignment covered the four operations in area 25, and one operation in Area 24. No on-grounds monitor coverage was originally slated for Barkley Sound given the low probability of operations locating there based on recent history. However, when one licence set up operations in Area 23, the spawn assessment vessel working in the area provided monitor coverage.

Additionally, the SOKMP provided coverage by eight port monitors, who were assigned to one of six designated landing locations on the coast, and observed landings to 11 different processors. Port monitoring efforts consisted of approximately 500 port monitoring hours covering 66 deliveries of SOK product. Monitors validated landed harvest documented by on-grounds records, validated drained weight measurements and in-plant transfers of both processed and unprocessed product between license holders, and audited the utilisation of J-license decals and pails during processing.

The SOK coastwide landings for 2002 were 399.8 tons based on 8 ton individual license quotas adjusted according to carryovers from 2001. These landings include the 48 ton enhanced production from three Heiltsuk communal licenses. SOK landings by area can be found in Table 6. Approximately 55% percent of the total harvest came from closed ponds and 45% from open ponds and lines. Almost all open-line production came from the Central Coast and West Coast Vancouver Island areas.

5.4. WINTER FOOD AND BAIT FISHERY

The winter food and bait fishery is intended to provide a small quantity of herring to firms wanting to engage in secondary processing of food herring products, and to satisfy frozen bait requirements of commercial and sports fishers.

Interested vessel owners submit an application to fish in an area, and vessels are selected to participate in this fishery through a lottery system. For the 2001 season, only those vessels that had a history of an "HS" license or a spawn on kelp "J" license designated to them in the past 5 years were eligible for entry into the lottery draw. The previous year, a vessel was required to have an "HS' license designated to it to qualify for a lottery draw. This change was brought about to prevent vessels that were not suitable, or not properly equipped to catch and handle herring, from entering the fishery. The change also allowed "J' license-designated vessels an opportunity, as they also have had experience in catching and handling herring. Vessels that were selected in the lottery system were issued a 2001 non-transferable 50 ton "ZM" category license, after producing documentation showing that the vessel had an approved stability certificate for catching or packing herring as required under the Canada Shipping Act. Vessels participating in this fishery must have a full sized herring seine net. All herring caught under this vessel quota system must, as a condition of the license, be delivered to a British Columbia port for catch weigh-in. Additionally, vessels were required to have an

approved observer on board at all times while carrying out fishing and off loading operations.

The 2001 allocation for the food and bait herring lottery fishery was 900 tons. Due to changes in migration patterns in herring, the fishery was not broken down into an allocation for the St. of Georgia, and a separate allocation for Johnstone St, all vessels could throughout Areas 13 to 18. Catch by fishery and area is detailed in Table 7.

The majority of the catch came from Area 17 and the remainder from Area 14. Herring showed up at the entrance to Nanoose Bay in early November but disappeared soon after. The focus of the fishery then switched to Stuart Channel in December as the fish showed up between DeCourcy and Ruxton Islands. The final 237 tons was caught in Area 14 in early February. Only one lottery license was not fished.

5.5. SPECIAL USE FISHERY

The special use herring fishery provides opportunities to utilise herring in alternative ways to the mainstream herring fisheries. Herring are caught for use as commercial sport bait; personal-use commercial bait; food, charity sales, zoo and aquarium food, and commercial bait sales.

A ZX or ZY licence is required to participate in the fishery, and a commercially licensed vessel is required for harvesting catch. Herring caught for personal-use commercial bait require a one ton ZX licence. A 3-ton ZY licence is required if the herring are caught for sale. License holders can be re-issued another license in the same license year provided that the license holder can demonstrate that the current license allocation of herring has been utilised (i.e. by submitting a completed landing report).

The allocations for the special use fishery are in addition to the fall food and bait lottery fishery. In 2001, the coastwide allocation for special use fisheries was 954 tons (Table 2). The breakdown was as follows: 13 tons commercial bait sales; 379 tons sports bait sales (which includes Walcan's 300 ton licence); 95 tons for personal use bait; 200 tons for food (i.e. Fjord licence); 150 tons for charity sales; and 110 tons for zoos and aquariums. There were 44 ZX and 29 ZY licences granted in 2001. Catch totals tallied from landing reports by licence type and area, are summarised in Table 7.

5.6. HERRING CONSERVATION AND RESEARCH SOCIETY

At the 1995 fall HIAB meeting, Department of Fisheries and Oceans (DFO) and industry representatives discussed and agreed to the formation of a non-profit organisation, the Herring Conservation & Research Society of BC (HCRS). The role of the Society is to support research that addresses the need for knowledge and understanding of herring biology and the factors that affect fluctuations in abundance. The goal of the HCRS is to assist DFO in developing the tools necessary for ensuring precautionary and risk averse management of the herring resource.

In the fall of 1996, the HCRS entered partnering arrangements with DFO related to fisheries management. A joint project agreement was signed, wherein the HCRS assumed responsibility for the test fishing program. The Society was given an allocation of fish to use to conduct the test fishing program. This allocation was determined by HIAB, in conjunction with DFO, and was included in the 1996/97 TAC. A portion of the roe herring TAC has been allocated to the HCRS to carry out test fishing activities in each subsequent year. The HCRS conducted test fishing activities for the sixth year in

2002[4]. In an effort to reduce overages, the roe fishery management plan stipulated that any overages caught by a seine or gillnet pool would be shared in the following order of priority: i) given to another pool in the area; ii) used as test payment; or iii) relinquished to the HCRS. Three hundred and eighty six (386) tons of test and roe overage remained after all pools had caught their quotas and all test vessels had completed their catch allocations.

Research activities funded by the HCRS are focused in the areas of stock assessment, annual data collection and database management, stock identification, and the influence of habitat and climate factors on herring survival and recruitment. Stock assessment related research activities consist of reviewing and evaluating the biological assumptions underlying the assessment models and adapting them accordingly. Recent contributions include area based analysis to investigating the use of otolith laser ablation to help determine stock structure. A considerable amount of effort and resources are being expended in the area of stock identification. Projects include micro-satellite DNA analysis, coded-wire tagging, and herring metapopulation analysis. Two field surveys have been conducted for several years. The first is a summer survey of relative herring abundance along the south-west coast of Vancouver Island, with a purpose of providing a recruitment forecast for the assessment of the west coast of Vancouver Island (WCVI) herring stock. The second field survey examines the summer distribution of adult and juvenile fish in the St. of Georgia and Johnstone St. Additionally, the distribution, abundance, food and feeding of juvenile herring and salmonids are examined to address the role of forage fish in an ecosystem. Projects are addressing the effects of habitat and climate issues on herring survival and productivity. For example, one program is examining the influence of climatic variations and species interactions on WCVI herring recruitment and growth. Other work in this area includes a study that is monitoring euphausiid and copepod population biology to assess the impact of their productivity on the population biology of WCVI herring. In 2002, a third field survey was added, to the Central Coast, to examine the feasibility of providing data relevant to stock assessment and identification.

In 2002, the HCRS approved and funded research and management projects totalling $917,100 as follows:

- biosampling database
- video survey of deep spawn in Barkley Sound
- microsatellite DNA analysis
- coded wire tagging study
- herring metapopulation analysis
- area based analysis
- otolith laser ablation
- juvenile herring surveys in St. of Georgia
- funding for spawn overflights in 2003
- funding to the Department for salaries for 1.5 fishery managers
- West Coast Vancouver Island recruitment and productivity
- bait herring assessment survey
- juvenile herring survey in Central Coast
- funding for spawn surveys in Johnstone St. in 2003

[4] See Section 5.7 Test Fishing Program

5.7. TEST FISHERY

A regional herring test fishing plan is developed for each season. The plan takes into consideration stock assessment requirements (i.e. are there enough vessels to conduct spawn surveys and to adequately sample fish stocks); management needs; and industry demands for timely size and roe maturity information. In most cases, a test fishing vessel is required to retire a license for the season (either seine or gillnet, depending on the charter) in order to participate in the test fishing program.

5.7.1. 2002 Test Fishing Program

The 2002 test fishing plan was approved by the HIAB at the October 2001 meeting. The HCRS received an allocation of 2,668 tons, (which included 200 tons to fund research projects[5]), to administer the test fishing program. This allocation was part of the TAC.

There were 25 vessels in the 2002 herring test fishing program. A summary of vessels by "category", areas worked, and license type required is found in Table 8.

In the Queen Charlotte Islands, the seine test vessel *Viking Pride* worked primarily in Area 2W but also provided some coverage in 2E, and *Queens Reach* worked in area 2E. The *Haida Storm* conducted all dive spawn surveys in the Queen Charlotte Islands, and had no separate testing duties. A total of 296 tons of test fish were required for payment of the QCI test boats.

Seine test fishing in Prince Rupert District was conducted by the *Ocean Venture*, a full seine charter working primarily in Areas 3, 4 and 5 and the *Ocean Horizon*, who worked in Area 5. Gillnet test fishing and dive spawn survey duties were conducted by *Royal Pride,* who also acted as the gillnet management platform. *Ocean Marauder* continued coded wire tagging in Prince Rupert on the third leg of its charter. A total of 406 tons of test fish were required for Prince Rupert test boats.

Six vessels worked in the Central Coast region in 2002: Ocean *Explorer* was the gillnet test and dive survey vessel; *Christav* had seine test and dive survey duties; *Kynoc* was the full seine charter; *Lasqueti Star* acted as the management platform; and *Ocean Royal* was the split charter with the St. of Georgia. *Ocean Marauder* continued coded wire tagging in the Central Coast on the second leg of its charter. The Central Coast test fish requirement was 576 tons.

A total of 11 vessels participated in the St. of Georgia / Johnstone St. test fishing program, covering a range of duties. *Thunder 1* and *Silver Viking* were gillnet test vessels and also conducted all dive surveys in this area; *Western Ranger* and *Royal Mariner 1* were full seine test fishing charters; *Ocean Royal* was split with the Central Coast; *Bernice C* was a short no-license charter; *Snowdrift* was the seine management platform; *Free to Wander* was the gillnet management platform; and *Ocean Marauder* provided services for the coded wire tagging program in the St. of Georgia, the Central Coast and Prince Rupert. Additionally, the *Port Lincoln* monitored and recorded spawns in Area 12, as did the *Discovery Huntress* in Area 13. Both Johnstone St. spawn survey vessels were paid in dollars. The test requirement for the St. of Georgia vessels was 750 tons.

A total of 5 vessels participated in the West Coast of Vancouver Island test fishing program, covering a range of duties. *Pacific Quest* was a seine test vessel working in Areas 23. *Viking Joy* and *Royal Viking* had dive survey as well as seine test duties. The

[5] See Section 5.6 (Herring Conservation & Research Society) for additional information

Viking Joy worked Area 25, while the *Royal Viking* worked in Areas 24, 25. *Ocean Horizon* was a split between Area 27 and Prince Rupert. Additionally, the *Marila* monitored and recorded spawns in Area 23. The test requirement for the West Coast of Vancouver Island vessels was 486 tons.

Total test fish requirement for all areas in 2002 was 2,514 tons, and 2,247 tons were caught. The shortage was made up from pool fishery overages for the payment of test vessels. Test vessels are listed by area of operation in Table 9. Additionally, this table includes dates of operation, bid rates, duration and final requirement of each charter. Table 10 records test fishing catch by location and section, as well as test fishing catch requirement for each stock assessment region.

ACKNOWLEDGEMENTS

Portions of the information included in the "Summary of Fisheries" section were obtained from managers' reports presented at the April HIAB meeting. Charles Fort provided spawn summary data in Table 5. Table 6 (the spawn on kelp table) was adapted from a table put together by J.O. Thomas and Associates on behalf of SOKOA.

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Table 1. 2002 Forecast biomass and recommended yield (tons) by region.

Region	Cut-off Biomass (tons)	Model Used*	Recruitment Assumption	Forecast Biomass (tons)	Recommended Yield (tons)	Observed Biomass (tons)•
Queen Charlotte Islands	11,795	RASM-2q	Average	15,421	3,086	3,014 (p)
Prince Rupert District	13,338	RASM-2q	Average	37,621	7,529	24,649 (a)
Central Coast	19,401	RASM-2q	Average	27,976	5,600	25,132 (a)
Strait Of Georgia	23,369	RASM-2q	Average to Good	113,647	22,707	132,128 (g)
West Coast Vancouver Island	20,723	RASM-2q	Poor	24,736	4,012	22,019 (g)
Total				**219,401**	**42,934**	**206,942**

* EM = Escapement Model

• Based on 2001 escapement model estimates. Letter in brackets describes observed recruitment: a = average, g = good, p = poor.

Table 2. Herring Working Group 2001/2002 expected use allocations (Tons) by fishery and region.

Region	STOCK ASSESSMENT COMMITTEE RECOMMENED CATCH [a]	MANAGEMENT WORKING GROUP CATCH QUOTA	HERRING MANAGEMENT WORKING GROUP ALLOCATIONS											
			FOOD, SOCIAL CEREMONIAL [b]	ROE HERRING		SOK		WINTER FOOD & BAIT	BAIT IMPNDMNT		PERS"L USE BAIT	CHAR-ITY	ZOO & AQUAR	TOTAL
				COM [c]	HCRS	J-LICENSE*	COMM COM [e]		COMM.	SPORT				Non Roe
QCI														
	3,086	500	150	1,554	370	1,000		0	3	9	0	0	0	1,532
PR														
	7,529	4,600	600	5,506	353	1,000		0	10	10	50	0	0	2,023
CC						(170)								170
	5,600	3,083	600	3,283	562	600	525	0	0	10	20	0	0	2,317
GULF						(100)		[c]						100
	22,707	17,817	35	19,887	850	200		1,400	0	50	25	150	110	2,820
WCVI						(35)								35
	4,012	500	150	2,729	533	600		0	0	0	0	0	0	1,283
TOTAL						(305)								(305)
	42,934	26,500	1,535	32,959	2,668	3,400	525	1,400	13	79	95	150	110	9,975

a) Based on forecast abundance of major migratory stocks (Minor stocks are shown in brackets).
b) Communal licences for food, social and ceremonial purposes will not limit access. DFO will work with the First Nations on a co-operative catch monitoring program.
c) Includes 300 ton allocation to Walcan and 200 ton to Fjord
d) Commercial roe allocation does not necessarily reflect the actual quota utilized
e) Commercial Communal is a separate SOK allocation to the Heiltsuk First Nation in accordance with the Supreme Court of Canada Gladstone decision.

Table 3. Final fishery notice of the 2002 roe herring fishing season.

AREA	NO. OF LICENCES	TARGET CATCH	CATCH*	% TOTAL CATCH	FISHERY DATES AND LOCATIONS
Strait of Georgia:					
Seine	144	9,442	9,685.4	35.8%	Open Mar 7 08:30 to 21:30 in Subareas 14-11, ptn 14-14 and 14-15.
					Re-opened Mar 8 08:37 to 19:00
Gill Net	922	8,375	8,639.6	31.9%	Open Mar 17 13:00 to Mar 20, 16:00 in Subareas 14-1 to 14-13 and 14-15,
					17-12, 17-18, 17-19, 17-21
Central Coast:					
Seine	55	2,633	2,635.6	9.7%	Open Mar 27 06:00 to 19:30 in Subareas 7-13 and ptns 7-14, 7-12 and 7-15.
					Re-opened Mar 28 05:30 to 21:05 also including ptn 7-3.
					Re-opened Mar 29 05:30 to 12:05
Gill Net	48	450	439.4	1.6%	Open Apr 2 10:00 to Apr 4 11:00 in Subarea 6-17, ptns 6-16 and 7-3.
					Open Apr 4 14:30 to Apr 5 06:30 in ptn 7-9.
WCVI:					
Gill net	63	500	428	1.6%	Open Mar 26 09:00 to Mar 28 16:00 in Subarea 25-13
Queen Charlotte Islands:					
Seine	8	500	502	1.9%	Open Mar 21 06:30 to Mar 22 14:20 in Subareas 2-12, 2-13
Prince Rupert:					
Seine	33	2,000	2,059.2	7.6%	Open Apr 3 11:45 to 21:00 in Subareas 5-10 and 5-11.
					Re-opened Apr 4 05:30 to 14:00 in Subareas 5-10 & 5-11.
					Re-opened Apr 5 09:14 to 20:00 in Subareas 5-10, 5-11 and ptn 5-4.
					Re-opened Apr 6 06:15 to 15:30
Gill Net	213	2,600	2,680.6	9.9%	Open Mar 25 14:00 to Mar 29 17:00 in Subareas 4-5 to 4-9 and ptn 4-10.
Total–Sn	**240**	**14,575**	**14,882.2**	**54.9%**	
Total–Gn	**1,246**	**11,925**	**12,187.6**	**45.1%**	
Total	**1,486**	**26,500**	**27,069.8**	**100.0%**	

*Catch numbers are weights validated at the point of landing.

Table 4. 2002 Roe quotas and validated landed catch (tons) by gear type and region.

		SEINE				GILLNET				TOTAL ROE	
Region	**Statistical Areas**	**Quota**	**# of Licences**	**# of Pools (SN)**	**Validated Catch**	**Quota**	**# of Licences**	**# of Pools (GN)**	**Validated Catch**	**Quota**	**Validated Catch**
Queen Charlotte Islands	2E	500	8	1	502	No Gillnet Fishery				**500**	**502**
Prince Rupert	3-5	2000	33	3	2059	2600	213	7	2681	**4600**	**4740**
Central Coast	6-8	2633	55	5	2636	450	48	8	440	**3083**	**3076**
Strait of Georgia	14-18	9442	144	8	9685	8375	922	15	8639	**17817**	**18325**
West Coast Vancouver Island	23-25	No Seine Fishery				500	63	4	428	**500**	**428**
TOTAL		**14575**	**240***		**14882**	**11925**	**1246†**		**12188**	**26500**	**27071**

* Number of seine licenses does not include 12 licenses retired for test fishing;
† Number of gillnet licenses does not include 9 licenses retired for test fishing;

Table 5. 2002 Spawn summary by location and statistical area.

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Statistical Area 2W: West Coast Q.C.I.							
Dive Survey							
Louscoone Inlet E	02-Mar	04-Mar	1300	23	0.82	54	12.90
Bottom				23	0.75	23	5.03
Macrocystis			1300	23	0.31		2.16
Kano Inlet	18-Mar	25-Mar	1150	26	1.96	63	36.60
Macrocystis			200	15	0.75		1.71
Dive Survey Total							**58.40**
Statistical Area 2E: East Coast Q.C.I.							
Dive Survey							
Burnaby Strait	21-Mar	28-Mar	4200	45	1.24	65	154.07
Bottom				45	0.96	16	28.73
Cecil Cove	15-Mar	16-Mar	800	124	0.76	78	58.9
Bottom				124	1.25	44	53.88
Macrocystis			800	40	1.67		10.40
Huston Inlet E	25-Feb	28-Feb	2000	47	1.37	24	30.45
Bottom				47	0.89	29	23.84
Huston Inlet W	25-Feb	28-Feb	1000	56	1.02	51	29.26
Bottom				56	0.87	11	5.31
Huxley Island	29-Mar	29-Mar	700	87	1.39	40	33.85
Bottom				87	0.25	5	0.76
Logan Inlet Head	19-Apr	19-Apr	750	33	0.07	53	0.90
Macrocystis			750	20	0.63		0.52
Powriveo Bay	16-Mar	16-Mar	1500	26	0.72	41	11.41
Bottom				26	0.66	19	4.93
Macrocystis			1200	9	0.92		2.70
Section Cove	21-Mar	28-Mar	200	25	0.74	45	1.67
Bottom				25	0.50	17	0.42
Traynor Creek	21-Feb	21-Feb	2300	52	0.70	54	45.25
Bottom				52	0.86	27	27.76
Macrocystis			1200	33	0.99		1.25
Dive Survey Area Total							**526.24**
Statistical Area 03: Nass							
Dive Survey							
Grassy Point	10-Apr	11-Apr	3500	43	0.81	40	48.53
Bottom				43	0.58	24	20.63
Dive Survey Area Total							**69.16**

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Statistical Area 04: Skeena							
Dive Survey							
Belletti Point	29-Mar	30-Mar	3275	254	0.73	34	208.59
Bottom				254	0.73	17	103.37
Big Bay	27-Mar	29-Mar	6600	312	1.05	37	802.10
Bottom				312	0.40	13	108.57
Burnt Cliff Island	29-Mar	30-Mar	3000	191	0.56	32	101.35
Bottom				191	0.53	17	51.59
Macrocystis			350	191	0.48		0.01
Butler Cove	19-Apr	19-Apr	2850	29	0.57	48	23.00
Bottom				29	0.07	11	0.66
Macrocystis			1400	10	0.88		2.85
Finlayson Island W	31-Mar	31-Mar	2450	97	0.66	41	64.57
Bottom				97	0.18	27	11.73
Macrocystis			350	10	0.50		0.43
Flat Top Islets	31-Mar	31-Mar	1000	27	0.47	44	5.53
Bottom				27	0.44	66	7.76
Macrocystis			350	27	0.47		0.44
Flat Top Islets	10-Apr	11-Apr	1940	32	1.02	40	24.99
Bottom				32	0.71	34	14.70
Hunt Inlet	23-Apr	23-Apr	2275	28	0.09	45	2.65
Bottom				28	0.06	15	0.54
Macrocystis			1000	6	0.50		0.64
Island Point	12-Apr	12-Apr	1400	55	0.35	24	6.41
Bottom				55	0.54	19	8.07
Macrocystis			1000	52	1.25		9.34
Mist Island	29-Mar	30-Mar	700	49	0.28	33	3.17
Bottom				49	0.12	37	1.45
Macrocystis			350	60	0.50		1.79
Pearl Harbour	31-Mar	31-Mar	3500	100	0.86	37	111.84
Bottom				100	0.16	7	3.88
Reeks Point	26-Mar	29-Mar	2450	259	1.00	34	212.72
Bottom				259	0.72	13	59.52
Swamp Island	24-Mar	29-Mar	350	51	0.04	17	0.12
Bottom				51	0.13	16	0.36
Tree Bluff	24-Mar	29-Mar	5250	393	0.67	29	392.21
Bottom				393	0.36	17	123.57
Dive Survey Area Total							**2470.53**

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Statistical Area 05: Grenville-Principe							
Dive Survey							
Clamshell Island	19-Apr	20-Apr	250	34	1.38	35	4.09
Bottom				34	0.44	6	0.23
Gurd Island	30-Mar	20-Apr	7000	98	1.39	42	403.20
Bottom				98	0.73	24	121.16
Gurd Point	29-Mar	30-Mar	1400	31	0.27	31	3.78
Bottom				31	0.23	20	2.01
Kingkown Inlet	07-Apr	07-Apr	4650	101	1.29	46	275.78
Bottom				101	0.53	12	29.58
Porcher Pen	04-Apr	06-Apr	2800	72	0.83	41	67.89
Bottom				72	0.52	17	17.87
Porcher Pen	18-Apr	19-Apr	1400	46	0.64	55	22.42
Bottom				46	0.01	9	0.05
Robert Island	30-Mar	05-Apr	3150	185	1.33	40	313.34
Bottom				185	1.20	12	86.38
Tangent Island	17-Apr	17-Apr	2264	36	0.97	39	30.27
Bottom				36	0.34	21	5.69
Dive Survey Area Total							**1383.76**
Statistical Area 06: Butedale							
Dive Survey							
Abrams Island	30-Mar	30-Mar	700	15	2.19	70	16.13
Bottom				15	2.20	71	16.51
Macrocystis				10	2.00		
Abrams Island	07-Apr	07-Apr	1400	144	2.47	48	236.17
Kwakwa Creek	08-Apr	09-Apr	1050	19	0.99	59	11.32
Bottom				19	0.57	49	5.39
Osment Inlet	02-Apr	04-Apr	5250	35	1.08	44	86.10
Bottom				35	0.59	38	40.53
Macrocystis			5250	41	2.43		109.69
Parsons Anchorage	03-Apr	04-Apr	2800	18	1.52	57	44.42
Bottom				18	0.80	38	15.64
Macrocystis			2800	18	1.56		31.50
West Higgins Pass	15-Apr	18-Apr	6300	45	1.73	59	290.97
Bottom				45	0.86	37	90.25
Macrocystis			2800	16	3.18		11.99
West Higgins Pass	15-Apr	18-Apr	4200	22	0.70	43	27.50
Bottom				22	0.31	7	2.12
Macrocystis			1750	16	1.40		4.95
Wilby Point	31-Mar	04-Apr	5600	25	1.42	52	103.44
Bottom				25	0.57	41	32.51
Macrocystis			2800	19	0.63		8.42
Wingate Point	08-Apr	09-Apr	1400	31	1.38	42	24.95

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Bottom				31	1.00	69	29.38
Macrocystis			350	10	6.00		8.19
Dive Survey Area Total							**1248.09**
Statistical Area 07: Bella Bella							
Surface Survey							
Hampden Bay	17-Apr	17-Apr			0.00	0	0.00
Joassa Channel	09-Apr	11-Apr	600	3	4.00	100	7.20
Joassa Channel	11-Apr	11-Apr	825	3	3.00	100	7.43
Joassa Channel	11-Apr	11-Apr	825	3	2.50	100	6.19
Joassa Channel	09-Apr	09-Apr	435	2	2.50	100	2.18
Joassa Channel	11-Apr	11-Apr	900	3	2.00	100	5.40
Little Thompson Bay	/	/	40	2	1.00	100	0.08
Mathieson Channel	/	/	11800	3	1.75	100	61.95
Mathieson Channel	/	/	420	5	2.00	100	4.20
McNaughton Group	17-Apr	17-Apr	27	3	1.48	100	0.12
McNaughton Group	/	/	30	3	2.00	100	0.18
McNaughton Group	/	/	60	5	2.00	100	0.60
McNaughton Group	/	/	85	5	1.00	100	0.43
McNaughton Group	/	/	60	2	0.10	100	0.01
Thompson Bay	/	/	233	1	0.50	100	0.12
Surface Survey Area Total							**96.07**
Dive Survey							
Balagny Pass	03-Apr	03-Apr	1750	32	2.86	77	123.13
Bottom				32	0.36	85	17.08
Berry Inlet	05-Apr	05-Apr	350	8	0.86	49	1.18
Bottom				8	0.25	20	0.14
Blair Inlet	03-Apr	03-Apr	350	11	3.19	55	6.75
Bottom				11	1.00	83	3.22
Branks Inlet	02-Apr	03-Apr	1050	28	1.49	46	20.15
Bottom				28	0.17	60	3.09
Bush Point	05-Apr	05-Apr	350	16	1.75	59	5.78
Bottom				16	0.80	68	3.05
Cameron Point	05-Apr	05-Apr	700	54	3.50	75	99.23
Bottom				54	1.67	80	50.40
Cecilia Island	02-Apr	05-Apr	900	53	2.77	74	97.36
Bottom				53	0.40	50	9.54
Cultus Sound	11-Apr	11-Apr	750	34	1.53	62	24.08
Bottom				34	0.21	61	3.24
Macrocystis			250	36	0.25		0.31
East Higgins Pass	/	/	5250	43	1.15	36	93.44

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Bottom				43	0.83	36	67.08
East Higgins Pass	/	/	1400	58	0.98	53	41.98
Bottom				58	1.05	26	21.83
East Higgins Pass	/	/	1050	36	1.73	42	27.26
Bottom				36	1.17	28	12.45
Hunter Channel	02-Apr	04-Apr	700	79	1.41	69	53.58
Bottom				79	1.29	40	28.57
Macrocystis			700	35	2.50		6.05
Hurricane Island	02-Apr	04-Apr	4900	31	1.59	42	99.46
Bottom				31	1.01	53	80.71
Macrocystis			3500	14	2.59		20.49
Joassa Channel	11-Apr	11-Apr	5390	14	2.22	50	82.89
Bottom				14	0.97	64	46.29
Leckie Bay	08-Apr	09-Apr	700	15	2.70	55	15.08
Bottom				15	1.28	87	11.30
Lockhart Bay	01-Apr	06-Apr	5250	21	2.34	55	139.20
Bottom				21	1.20	65	84.51
McGown Point	01-Apr	06-Apr	1750	22	2.48	46	43.02
Bottom				22	1.84	79	55.12
Mosquito Bay	02-Apr	03-Apr	4550	19	2.12	47	84.97
Bottom				19	1.23	56	58.17
Neekas Cove	02-Apr	03-Apr	2975	23	2.12	55	78.72
Bottom				23	1.05	51	36.21
Neekas Inlet	02-Apr	03-Apr	5950	16	2.46	64	149.50
Bottom				16	1.43	79	107.33
Oliver Cove	01-Apr	05-Apr	450	20	2.11	65	12.36
Bottom				20	1.10	83	8.28
Port Blackney	05-Apr	05-Apr	350	33	0.98	43	4.92
Bottom				33	0.67	27	2.05
Powell Anchorage	02-Apr	03-Apr	5250	43	1.69	66	252.78
Bottom				43	0.76	51	88.8
Macrocystis			350	5	4.00		4.90
Reid Pass	03-Apr	03-Apr	350	6	2.00	75	3.15
Bottom				6	2.00	100	4.20
Watch Island	02-Apr	03-Apr	3150	47	2.17	56	178.46
Bottom				47	1.09	51	81.34
Dive Survey Area Total							**2654.18**
Statistical Area 08: Bella Coola							
Dive Survey							
Illahie Inlet	28-Mar	01-Apr	3025	32	2.16	43	90.40
Bottom				32	0.85	64	52.42
Illahie Inlet	05-Apr	06-Apr	3150	22	3.14	48	104.39
Bottom				22	2.19	63	95.65

Table 5. Continued

Spawning Ground	Spawn Date		Length	Width	Layers	Cover	S.A.I
	Start	End	(m)	(m)		(%)	
Kiwash Cove	02-Apr	03-Apr	700	42	0.83	79	19.26
Bottom				42	0.25	22	1.65
Kwakume Inlet	24-Mar	01-Apr	4550	30	1.68	39	88.56
Bottom				30	1.04	58	81.43
Kwakume Point	24-Mar	01-Apr	6300	17	2.51	46	125.36
Bottom				17	1.34	60	87.32
Kwakume Point	28-Mar	01-Apr	700	15	0.78	27	2.17
Bottom				15	1.33	61	8.28
Pruth Bay	03-Apr	03-Apr	1750	6	2.07	49	10.96
Bottom				6	0.91	53	5.24
Pruth Bay	03-Apr	03-Apr	250	6	1.75	87	2.28
Bottom				6	0.83	100	1.25
Whidbey Point	28-Mar	02-Apr	700	13	2.86	71	17.67
Bottom				13	2.06	79	14.17
Whidbey Point	28-Mar	02-Apr	1750	17	1.29	50	19.08
Bottom				17	0.92	70	19.11
Dive Survey Area Total							**846.61**
Statistical Area 09: Rivers Inlet							
Dive Survey							
Moses Inlet	25-Mar	25-Mar	14700	14	1.83	54	201.17
Bottom				14	1.12	67	154.17
Moses Inlet	25-Mar	25-Mar	1050	5	0.47	44	1.10
Bottom				5	0.08	88	0.36
Moses Inlet	25-Mar	25-Mar	8350	12	0.85	46	37.92
Bottom				12	0.44	53	22.40
Moses Inlet	25-Mar	25-Mar	1750	12	1.98	54	21.43
Bottom				12	1.11	82	18.23
Dive Survey Area Total							**456.79**
Statistical Area 10: Smith Inlet							
Surface Survey							
McBride Bay	13-Mar	15-Mar	80	4	2.60	100	0.83
McBride Bay	13-Mar	15-Mar	33	4	4.40	100	0.58
McBride Bay	13-Mar	15-Mar	84	6	2.00	100	1.01
McBride Bay	13-Mar	15-Mar	112	6	1.00	100	0.67
McBride Bay	13-Mar	15-Mar	94	4	3.00	100	1.13

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
McBride Bay	13-Mar	15-Mar	112	2	2.00	100	0.45
McBride Bay	13-Mar	15-Mar	97	2	3.00	100	0.58
McBride Bay	13-Mar	15-Mar	140	4	1.00	100	0.56
McBride Bay	13-Mar	15-Mar	47	4	3.00	100	0.56
McBride Bay	13-Mar	15-Mar	101	2	2.00	100	0.40
McBride Bay	13-Mar	15-Mar	12	2	4.00	100	0.10
McBride Bay	13-Mar	15-Mar	89	2	2.00	100	0.36
McBride Bay	13-Mar	15-Mar	70	2	3.00	100	0.42
McBride Bay	13-Mar	15-Mar	146	2	1.00	100	0.29
McBride Bay	13-Mar	15-Mar	93	4	1.00	100	0.37
McBride Bay	13-Mar	15-Mar	216	2	3.00	100	1.30
McBride Bay	13-Mar	15-Mar	67	4	2.00	100	0.54
McBride Bay	13-Mar	15-Mar	127	4	3.00	100	1.52
McBride Bay	13-Mar	15-Mar	93	2	3.00	100	0.56
McBride Bay	13-Mar	15-Mar	100	2	2.00	100	0.40
McBride Bay	13-Mar	15-Mar	50	2	2.00	100	0.20
McBride Bay	13-Mar	15-Mar	34	2	2.00	100	0.14
McBride Bay	13-Mar	15-Mar	35	2	3.00	100	0.21
McBride Bay	13-Mar	15-Mar	120	2	4.00	100	0.96
McBride Bay	13-Mar	15-Mar	200	4	3.00	100	2.40
McBride Bay	13-Mar	15-Mar	36	4	1.00	100	0.14
McBride Bay	13-Mar	15-Mar	26	2	3.00	100	0.16
McBride Bay	13-Mar	15-Mar	40	2	4.00	100	0.32
McBride Bay	13-Mar	15-Mar	61	4	1.00	100	0.24
McBride Bay	13-Mar	15-Mar	70	4	3.00	100	0.84
McBride Bay	13-Mar	15-Mar	50	2	3.00	100	0.30
McBride Bay	13-Mar	15-Mar	80	2	4.00	100	0.64
McBride Bay	13-Mar	15-Mar	56	2	2.00	100	0.22
McBride Bay	13-Mar	15-Mar	33	2	4.00	100	0.26
McBride Bay	13-Mar	15-Mar	139	2	2.00	100	0.56
McBride Bay	13-Mar	15-Mar	43	2	3.00	100	0.26
McBride Bay	13-Mar	15-Mar	50	2	1.00	100	0.10
Surface Survey Area Total							**20.58**
Dive Survey							
Birkby Point	03-Apr	03-Apr	1750	13	0.72	53	8.45
Bottom				13	0.56	34	4.21
Macrocystis			1050	10	1.39		3.17
Dry Creek	01-Apr	02-Apr	700	34	0.76	60	10.57
Bottom				34	0.65	33	5.10
Fly Basin	04-Apr	04-Apr	1400	26	1.25	82	36.63
Bottom				26	0.81	18	5.08
McBride Bay	01-Apr	01-Apr	1400	25	1.67	87	49.49
Bottom				25	0.40	26	3.65
Takush Harbour	04-Apr	04-Apr	2800	25	1.76	56	68.81
Bottom				25	0.65	39	17.64

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Macrocystis			1050	20	2.17		14.24
Dive Survey Area Total							**227.03**
Statistical Area 12: Alert Bay							
Surface Survey							
Ahnuhati Point	27-Mar	29-Mar	60	1	1.00	100	0.06
Ahnuhati Point	27-Mar	29-Mar	30	2	0.53	100	0.03
Ahnuhati Point	27-Mar	29-Mar	55	2	1.45	100	0.16
Ahnuhati Point	27-Mar	29-Mar	100	3	1.70	100	0.51
Ahnuhati Point	27-Mar	29-Mar	350	2	0.55	100	0.39
Ahnuhati Point	27-Mar	29-Mar	210	2	0.25	100	0.11
Ahnuhati Point	27-Mar	29-Mar	80	1	1.00	100	0.08
Ahnuhati Point	27-Mar	29-Mar	130	1	0.53	100	0.07
Ahnuhati Point	27-Mar	29-Mar	110	10	1.40	100	1.54
Ahnuhati Point	27-Mar	29-Mar	40	5	1.40	100	0.28
Axe Point	27-Mar	29-Mar	25	2	1.48	100	0.07
Axe Point	27-Mar	29-Mar	60	2	0.53	100	0.06
Axe Point	27-Mar	29-Mar	60	1	0.25	100	0.02
Axe Point	27-Mar	29-Mar	150	1	0.29	100	0.04
Axe Point	27-Mar	29-Mar	150	1	0.55	100	0.08
Axe Point	27-Mar	29-Mar	20	1	0.53	100	0.01
Axe Point	27-Mar	29-Mar	50	5	1.00	100	0.25
Axe Point	27-Mar	29-Mar	55	2	1.00	100	0.11
Bond Sound	31-Mar	31-Mar	20	1	0.25	100	0.01
Bond Sound	31-Mar	31-Mar	10	1	0.15	100	0.00
Bond Sound	31-Mar	31-Mar	28	2	0.25	100	0.01
Cattle Island	02-Apr	02-Apr	720	10	1.00	100	7.20
Deer Bay	27-Mar	29-Mar	60	4	1.45	100	0.35
Deer Bay	27-Mar	29-Mar	72	2	1.00	100	0.14
Deer Bay	27-Mar	29-Mar	210	1	0.29	100	0.06
Deer Bay	27-Mar	29-Mar	210	1	0.55	100	0.12
Deer Bay	27-Mar	29-Mar	220	15	1.45	100	4.79
Deer Bay	27-Mar	29-Mar	1000	6	1.00	100	6.00
Deer Bay	27-Mar	29-Mar	2119	1	0.53	100	1.11
Deer Bay	27-Mar	29-Mar	70	2	1.48	100	0.21
Kingcome Inlet	23-Mar	24-Mar	61	10	4.90	100	2.99
Kingcome Inlet	23-Mar	24-Mar	30	14	5.30	100	2.23
Kingcome Inlet	23-Mar	24-Mar	30	10	3.60	100	1.08
Kingcome Inlet	23-Mar	24-Mar	935	6	2.20	100	12.34
Kingcome Inlet	23-Mar	24-Mar	572	5	1.00	100	2.86
Kingcome Inlet	23-Mar	24-Mar	581	3	0.55	100	0.96
Knight Inlet Head	27-Mar	29-Mar	430	20	1.00	100	8.60
Knight Inlet Head	27-Mar	29-Mar	250	20	0.43	100	2.15
Peel Island	02-Apr	02-Apr	30	4	0.55	100	0.07

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Peel Island	02-Apr	02-Apr	20	2	1.00	100	0.04
Rubble Point	27-Mar	29-Mar	1560	1	0.29	100	0.45
Rubble Point	27-Mar	29-Mar	100	3	1.00	100	0.30
Rubble Point	27-Mar	29-Mar	500	4	1.35	100	2.70
Rubble Point	27-Mar	29-Mar	60	3	1.00	100	0.18
Rubble Point	27-Mar	29-Mar	50	2	1.00	100	0.10
Thompson Sound	30-Mar	01-Apr	130	3	1.00	100	0.39
Thompson Sound	30-Mar	01-Apr	420	1	0.53	100	0.22
Thompson Sound	30-Mar	01-Apr	130	1	1.00	100	0.13
Thompson Sound	30-Mar	01-Apr	20	2	1.48	100	0.06
Thompson Sound	30-Mar	01-Apr	40	10	2.00	100	0.80
Thompson Sound	30-Mar	01-Apr	20	1	1.00	100	0.02
Thompson Sound	30-Mar	01-Apr	725	2	1.45	100	2.10
Thompson Sound	30-Mar	01-Apr	110	2	1.00	100	0.22
Thompson Sound	30-Mar	01-Apr	30	4	1.45	100	0.17
Thompson Sound	30-Mar	01-Apr	60	2	0.53	100	0.06
Thompson Sound	30-Mar	01-Apr	20	4	1.00	100	0.08
Thompson Sound	30-Mar	01-Apr	20	30	3.00	100	1.80
Thompson Sound	30-Mar	01-Apr	10	2	1.90	100	0.04
Thompson Sound	30-Mar	01-Apr	300	3	1.00	100	0.90
Thompson Sound	30-Mar	01-Apr	60	5	1.20	100	0.36
Thompson Sound	30-Mar	01-Apr	95	15	1.40	100	2.00
Thompson Sound	30-Mar	01-Apr	60	15	1.00	100	0.90
Thompson Sound	30-Mar	01-Apr	30	10	1.45	100	0.44
Tribune Channel	15-Apr	16-Apr	70	6	1.00	100	0.42
Tribune Channel	15-Apr	16-Apr	40	6	2.00	100	0.48
Tribune Channel	15-Apr	16-Apr	50	1	1.45	100	0.07
Tribune Channel	15-Apr	16-Apr	50	1	0.53	100	0.03
Tribune Channel	15-Apr	16-Apr	65	2	1.00	100	0.13
Tribune Channel	31-Mar	02-Apr	120	2	0.65	100	0.16
Tribune Channel	31-Mar	02-Apr	75	10	1.50	100	1.13
Tribune Channel	31-Mar	02-Apr	35	3	1.50	100	0.16
Tribune Channel	31-Mar	02-Apr	318	1	0.29	100	0.09
Tribune Channel	31-Mar	02-Apr	120	2	0.53	100	0.13
Tribune Channel	31-Mar	02-Apr	200	2	0.53	100	0.13
Tribune Channel	31-Mar	02-Apr	40	10	1.00	100	0.40
Tribune Channel	31-Mar	02-Apr	42	2	1.00	100	0.08
Tribune Channel	31-Mar	02-Apr	92	1	1.00	100	0.09
Tribune Channel	31-Mar	02-Apr	30	1	0.50	100	0.02
Tribune Channel	31-Mar	02-Apr	20	2	1.00	100	0.04
Tribune Channel	31-Mar	02-Apr	40	2	1.45	100	0.12
Tribune Channel	31-Mar	02-Apr	70	10	1.00	100	0.70
Tribune Channel	31-Mar	02-Apr	120	2	1.00	100	0.24
Tribune Channel	31-Mar	02-Apr	500	2	0.50	100	0.50
Tribune Channel	31-Mar	02-Apr	350	1	0.50	100	0.18

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Tribune Channel	31-Mar	02-Apr	47	3	1.00	100	0.14
Wahkash Creek	27-Mar	29-Mar	170	4	1.80	100	1.22
Wahshihlas Bay	27-Mar	29-Mar	125	20	2.80	100	7.00
Wahshihlas Bay	27-Mar	29-Mar	230	3	1.00	100	0.69
Wahshihlas Bay	27-Mar	29-Mar	374	2	0.53	100	0.39
Wahshihlas Bay	27-Mar	29-Mar	57	18	1.90	100	1.95
Wakeman Sound	19-Mar	21-Mar	462	5	0.29	100	0.66
Wakeman Sound	19-Mar	21-Mar	220	23	0.29	100	1.45
Wakeman Sound	19-Mar	21-Mar	60	20	0.53	100	0.63
Wakeman Sound	19-Mar	21-Mar	220	2	0.25	100	0.11
Wakeman Sound	19-Mar	21-Mar	75	1	0.12	100	0.01
Wakeman Sound	19-Mar	21-Mar	50	3	0.50	100	0.08
Wakeman Sound	19-Mar	21-Mar	210	1	0.29	100	0.06
Wakeman Sound	19-Mar	21-Mar	150	2	1.40	100	0.42
Wakeman Sound	19-Mar	21-Mar	100	4	1.80	100	0.72
Wakeman Sound	19-Mar	21-Mar	125	7	1.35	100	1.18
Wakeman Sound	19-Mar	21-Mar	40	9	1.85	100	0.67
Wakeman Sound	19-Mar	21-Mar	200	5	1.40	100	1.40
Wakeman Sound	19-Mar	21-Mar	125	3	0.55	100	0.21
Wakeman Sound	19-Mar	21-Mar	260	3	1.00	100	0.78
Wakeman Sound	19-Mar	21-Mar	60	1	0.12	100	0.01
Wakeman Sound	22-Mar	23-Mar	250	5	0.60	100	0.75
Wakeman Sound	22-Mar	23-Mar	300	6	1.00	100	1.80
Wakeman Sound	22-Mar	23-Mar	100	9	0.40	100	0.36
Wakeman Sound	22-Mar	23-Mar	480	5	1.00	100	2.40
Wakeman Sound	22-Mar	23-Mar	260	4	1.00	100	1.04
Wakeman Sound	22-Mar	23-Mar	60	10	2.40	100	1.44
Wakeman Sound	22-Mar	23-Mar	540	6	2.80	100	9.07
Wakeman Sound	22-Mar	23-Mar	100	3	4.40	100	1.32
Wakeman Sound	22-Mar	23-Mar	1439	4	2.38	100	13.67
Wakeman Sound	22-Mar	23-Mar	1400	4	1.80	100	10.08
Wakeman Sound	22-Mar	23-Mar	100	8	3.70	100	2.96
Wakeman Sound	22-Mar	23-Mar	1217	6	1.00	100	7.30
Surface Survey Area Total							**148.84**
Statistical Area 13: Quathiaski							
Surface Survey							
Campbell River	19-Mar	23-Mar	42	8	3.50	100	1.18
Campbell River	19-Mar	23-Mar	90	12	6.00	100	6.48
Campbell River	19-Mar	23-Mar	29	20	6.00	100	3.48
Campbell River	19-Mar	23-Mar	48	12	6.00	100	3.46
Campbell River	19-Mar	23-Mar	21	8	4.00	100	0.67
Campbell River	19-Mar	23-Mar	120	16	4.00	100	7.68
Campbell River	19-Mar	23-Mar	44	12	4.00	100	2.11

Table 5. Continued

Spawning Ground	Spawn Date		Length	Width	Layers	Cover	S.A.I
	Start	End	(m)	(m)		(%)	
Campbell River	19-Mar	23-Mar	28	8	4.00	100	0.90
Campbell River	19-Mar	23-Mar	186	8	3.00	100	4.46
Campbell River	19-Mar	23-Mar	69	12	4.00	100	3.31
Campbell River	19-Mar	23-Mar	230	4	3.00	100	2.76
Campbell River	19-Mar	23-Mar	99	12	3.00	100	3.56
Campbell River	19-Mar	23-Mar	50	46	3.00	100	6.90
Loughborough Inlet	13-Mar	15-Mar	64	4	3.00	100	0.77
Loughborough Inlet	13-Mar	15-Mar	178	2	4.00	100	1.42
Loughborough Inlet	13-Mar	15-Mar	76	3	2.00	100	0.46
Loughborough Inlet	13-Mar	15-Mar	63	2	2.00	100	0.28
Loughborough Inlet	13-Mar	15-Mar	38	2	2.20	100	0.15
Loughborough Inlet	13-Mar	15-Mar	10	2	4.00	100	0.08
Loughborough Inlet	13-Mar	15-Mar	28	2	3.00	100	0.17
Loughborough Inlet	13-Mar	15-Mar	22	2	5.00	100	0.22
Loughborough Inlet	13-Mar	15-Mar	47	2	4.00	100	0.38
Loughborough Inlet	13-Mar	15-Mar	44	3	4.00	100	0.53
Loughborough Inlet	13-Mar	15-Mar	24	3	2.00	100	0.14
Loughborough Inlet	13-Mar	15-Mar	37	8	3.00	100	0.89
Loughborough Inlet	13-Mar	15-Mar	50	8	4.00	100	1.60
Loughborough Inlet	13-Mar	15-Mar	47	4	2.00	100	0.38
Loughborough Inlet	13-Mar	15-Mar	54	4	1.00	100	0.22
Waddington Harbour	13-Mar	15-Mar	1500	2	2.00	100	6.00
Waddington Harbour	13-Mar	15-Mar	240	6	1.00	100	1.44
Waddington Harbour	13-Mar	15-Mar	130	2	3.00	100	0.78
Waddington Harbour	13-Mar	15-Mar	300	2	6.00	100	3.60
Waddington Harbour	13-Mar	15-Mar	200	6	6.00	100	7.20
Waddington Harbour	13-Mar	15-Mar	200	4	2.00	100	1.60
Waddington Harbour	13-Mar	15-Mar	20	4	6.00	100	0.48
Waddington Harbour	13-Mar	15-Mar	100	2	1.00	100	0.20
Waddington Harbour	13-Mar	15-Mar	130	2	4.00	100	1.04
Waddington Harbour	13-Mar	15-Mar	44	2	1.00	100	0.09
Willow Point	19-Mar	23-Mar	360	30	3.00	100	32.40
Willow Point	19-Mar	23-Mar	348	30	3.00	100	31.32
Willow Point	19-Mar	23-Mar	466	30	3.00	100	41.94
Willow Point	19-Mar	23-Mar	411	25	3.00	100	30.83
Willow Point	19-Mar	23-Mar	480	50	3.00	100	72.00
Willow Point	19-Mar	23-Mar	843	60	3.00	100	151.74
Willow Point	19-Mar	23-Mar	456	40	3.00	100	54.72
Willow Point	19-Mar	23-Mar	431	100	4.05	100	174.56
Willow Point	19-Mar	23-Mar	453	100	4.00	100	181.20
Surface Survey Area Total							**847.75**
Dive Survey							
Willow Point	20-Mar	25-Mar	2450	146	0.96	62	213.64
Bottom				146	0.97	14	49.56

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Dive Survey Area Total							**263.20**
Statistical Area 14: Comox							
Dive Survey							
Big Qualicum River	31-Mar	31-Mar	700	75	0.47	22	5.39
Bottom				75	1.00	1	0.44
Boyle Point	12-Mar	12-Mar	4550	59	0.64	40	69.99
Bottom				59	0.69	43	78.97
Cape Lazo	16-Mar	27-Mar	3150	1221	2.65	56	5702.00
Bottom				1221	1.59	38	2306.51
Columbia Beach	15-Mar	20-Mar	4200	471	0.82	36	579.10
Bottom				471	0.34	10	66.59
Cottam Point	19-Mar	20-Mar	525	68	1.82	53	34.42
Bottom				68	0.84	23	6.84
Englishman River	14-Mar	19-Mar	3150	263	2.09	32	558.88
Bottom				263	1.04	7	60.18
French Creek	14-Mar	19-Mar	3500	326	2.53	39	1119.40
Bottom				326	1.13	14	180.93
Gravelly Bay	12-Mar	12-Mar	175	47	0.01	44	0.04
Bottom				47	0.01	50	0.04
Kitty Coleman Beach	17-Mar	20-Mar	8750	241	1.88	37	1480.52
Bottom				241	0.93	21	416.26
Komas Bluff	25-Mar	29-Mar	4900	311	2.04	34	1059.71
Bottom				311	0.78	15	182.32
Kye Bay	16-Mar	25-Mar	4200	480	2.60	35	1848.39
Bottom				480	1.54	17	536.20
Little River	16-Mar	21-Mar	3500	153	1.11	36	214.83
Bottom				153	0.67	25	90.31
Madrona Point	19-Mar	20-Mar	2100	123	1.56	33	132.71
Bottom				123	1.23	22	68.69
Northwest Bay	19-Mar	20-Mar	350	67	1.58	46	16.88
Bottom				67	0.70	46	7.50
Nuttal Bay	14-Mar	15-Mar	2450	40	1.94	52	98.38
Bottom				40	1.50	40	59.15
Oyster Bay	20-Mar	20-Mar	8050	192	0.69	34	364.87
Bottom				192	0.62	21	196.83
Oyster River	21-Mar	21-Mar	7350	102	0.84	33	206.07
Bottom				102	0.57	11	44.91
Parksville Bay	14-Mar	19-Mar	1750	276	1.67	31	254.30
Bottom				276	1.16	5	26.59
Qualicum Beach	12-Mar	20-Mar	5600	195	0.24	27	70.37
Bottom				195	0.02	13	3.38
Rathtrevor Beach	14-Mar	19-Mar	2100	168	0.98	50	173.22
Seal Bay+	15-Mar	21-Mar	3500	263	1.20	37	410.59
Bottom				263	0.84	31	240.45

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Willemar Bluff	19-Mar	27-Mar	2450	117	1.46	27	111.27
Bottom				117	1.36	21	81.90
Dive Survey Area Total							**19166.34**
Statistical Area 17: Nanaimo							
Dive Survey							
Blunden Point	17-Mar	17-Mar	3850	208	1.22	48	462.77
Bottom				208	0.50	3	13.45
Coffin Point	09-Apr	09-Apr	1750	49	3.32	49	137.86
Bottom				49	1.50	31	39.28
Coffin Point	09-Apr	09-Apr	1050	71	0.95	36	26.01
Departure Bay	04-Mar	04-Mar	700	15	1.75	46	8.35
Bottom				15	1.50	10	1.50
Departure Bay	09-Apr	09-Apr	1050	9	2.44	39	9.45
Dorcas Point	19-Mar	20-Mar	700	25	1.33	38	8.90
Bottom				25	1.29	15	3.31
Dorcas Point	05-Apr	05-Apr	3150	21	.079	36	19.09
Bottom				21	1.38	8	7.15
Evening Cove	30-Mar	01-Apr	2450	31	2.01	34	51.89
Bottom				31	1.46	15	16.93
Hammond Bay	17-Mar	20-Mar	1750	75	2.09	51	140.42
Bottom				75	1.64	11	24.57
Horswell Bluff	19-Mar	20-Mar	2450	100	1.08	35	92.74
Bottom				100	0.78	15	29.16
Icarus Point	15-Mar	19-Mar	3150	298	1.15	43	461.51
Bottom				298	1.65	11	174.15
Kulleet Bay	09-Apr	09-Apr	4200	32	1.71	41	94.22
Bottom				32	0.70	3	2.4
Lagoon Head	19-Mar	20-Mar	1400	45	1.15	53	38.01
Bottom				45	1.84	24	27.93
Lantzville	15-Mar	17-Mar	2100	112	0.84	34	66.86
Bottom				112	0.60	10	14.16
Nankivell Point	05-Apr	05-Apr	2450	47	1.76	42	84.65
Bottom				47	1.63	22	41.55
Nanoose Bay	26-Mar	28-Mar	3850	89	2.32	59	469.22
Bottom				89	4.00	1	8.02
Nanoose Bay Head	26-Mar	28-Mar	2100	133	3.02	47	391.03
Bottom				133	0.75	1	1.61
Nares Point	09-Apr	09-Apr	700	61	0.51	29	6.17
Bottom				61	0.50	7	1.57
Neck Point	19-Mar	20-Mar	2100	86	1.14	47	97.69
Bottom				86	1.28	21	47.72
Ranch Point	20-Mar	22-Mar	3500	52	3.19	47	272.66
Bottom				52	1.28	12	29.09

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Schooner Cove	05-Apr	05-Apr	2100	50	2.22	41	95.29
Bottom				50	1.77	22	40.14
Sunrise Beach +	17-Mar	20-Mar	2800	214	1.81	44	480.43
Bottom				214	1.44	17	146.54
Wallis Point	20-Mar	22-Mar	1925	81	2.42	47	175.28
Bottom				81	1.40	20	44.19
Wallis Point	05-Apr	05-Apr	2100	32	1.82	39	47.64
Bottom				32	1.88	16	20.27
Yellow Point	09-Apr	09-Apr	3500	95	3.14	41	432.42
Bottom				95	1.00	16	54.58
Yellow Point N	09-Apr	09-Apr	1750	27	2.52	40	47.08
Bottom				27	2.06	11	10.86
Dive Survey Area Total							**5017.76**
Statistical Area 19: Saanich Peninsula							
Dive Survey							
Deep Cove	10-Apr	10-Apr	700	10	1.97	18	2.52
Bottom				10	1.17	2	0.18
Patricia Bay	10-Apr	10-Apr	4900	79	2.24	31	271.60
Bottom				79	1.69	4	26.32
Dive Survey Area Total							**300.62**
Statistical Area 23: Barkley Sound							
Dive Survey							
Forbes Is	25-Feb	25-Feb	2275	150	2.48	24	201.27
Bottom				150	1.75	36	214.85
Macoah Pass	25-Feb	01-Mar	2800	70	0.35	38	25.76
Bottom				70	0.56	23	25.76
Macoah Pass	26-Mar	27-Mar	615	121	2.16	47	75.9
Bottom				121	0.28	47	9.93
Maggie River	26-Mar	26-Mar	2500	59	1.96	43	124.85
Bottom				59	1.14	22	36.9
Ottaway Islet	26-Mar	27-Mar	500	102	0.31	53	8.42
Bottom				102	0.26	26	3.45
Stopper Island	23-Mar	26-Mar	12600	86	2.37	62	1588.69
Bottom				86	1.49	37	602.46
Toquart Bay	26-Mar	26-Mar	1100	60	2.83	62	116.69
Two Rivers +	25-Feb	25-Feb	2450	202	1.11	37	201.26
Bottom				202	0.24	43	51.73
Dive Survey Area Total							**410.14**

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Statistical Area 24: Clayoquot Sound							
Dive Survey							
Baseball Cove +	24-Mar	27-Mar	1100	124	0.67	17	15.07
Bottom				124	0.46	43	26.96
Hootla Kootla +	23-Mar	15-Mar	4550	187	2.42	33	676.80
Bottom				187	1.09	59	553.24
Dive Survey Area Total							**1272.06**
Statistical Area 25: Nootka Sound							
Dive Survey							
Garden Pt	25-Mar	26-Mar	1750	146	0.78	29	58.01
Bottom				146	0.29	32	23.60
Inner Nuchatlitz	26-Mar	27-Mar	3860	262	1.68	25	424.44
Bottom				262	0.31	24	73.47
Macrocystis			2450	115	1.91		64.66
Outer Nuchatlitz	28-Mar	28-Mar	1050	133	0.90	25	31.81
Bottom				133	0.05	22	1.45
Macrocystis			1400	115	2.25		62.78
Owossitsa Cr	25-Mar	26-Mar	2450	46	0.92	28	39.31
Bottom				46	0.34	45	17.49
Macrocystis			1050	7	0.92		3.14
Rosa Harbour	26-Mar	27-Mar	700	100	6.89	31	151.65
Bottom				100	0.25	5	0.89
Rosa Island	26-Mar	27-Mar	700	48	0.01	17	0.06
Macrocystis			350	11	0.50		1.08
Dive Survey Area Total							**943.84**
Statistical Area 26: Kyuquot Sound							
Dive Survey							
Clanninick Cove	01-Apr	01-Apr	2150	47	1.88	36	69.02
Bottom				47	1.67	27	45.47
McLean Island	01-Apr	01-Apr	1750	64	1.05	52	61.82
Bottom				64	0.84	31	29.50
Macrocystis			2150	32	1.67		184.85
Dive Survey Area Total							**390.67**

Table 5. Continued

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover (%)	S.A.I
Statistical Area 27: Quatsino Sound							
Dive Survey							
Forward Inlet	31-Mar	31-Mar	1750	64	1.42	42	66.67
Bottom				64	0.55	30	18.67
Macrocystis			2450	57	0.06		2.70
Hazard Point	31-Mar	31-Mar					
Macrocystis			350	37	1.00		5.72
Moores Island	31-Mar	31-Mar	500	16	1.88	89	13.59
Quashtin Creek	31-Mar	31-Mar	1400	18	1.74	72	31.59
Bottom				18	0.34	33	2.81
Dive Survey Area Total							**141.76**

Table 6. 2002 SOK Licences and landed product weight (lbs.) by statistical area and location.

Geographic Area and Statistical Area	Harvest Location	No. of Licenses	Spawn-on-Kelp Quota (lbs.)	Harvest (lbs.)
Queen Charolatte Islands				
Area 2E	Louscoone			14,433
	De La Beche			57,613
	Section Cove			28,112
	Skidegate			1,232
	Nomad Islet			15,329
Area Subtotal		**10**	**155,141**	**116,719**
Prince Rupert				
Area 4	Pearl Harbour	7	116,424	51,981
	Big Bay			24,981
	Island Point			32,356
	Otter Anchorage			18,562
Area 5	Gurd Island	3	52,000	47,163
	Gurd Lagoon			2,317
Area Subtotal		**10**	**168,424**	**177,360**
Central Coast				
Area 6/7/8	Higgins Pass	6	99,563	43,390
	Powell Anchorage			20,837
	Kwakume			19,249
	Illahie			16,337
Area 7	Kwakume/Dundavin	9	231,082	240,061
Area 10/12	Takush Harbour/Cattle Islands	4	64,037	43,251
Area Subtotal		**19**	**394,682**	**383,125**
WCVI				
Area 23/24/25/27	Young Bay/Baseball Bay	7		11,958
	Rosa Harbour			73,267
	Stopper Island			16,210
	Winter Harbour			21,007
Area Subtotal		**7**	**116,502**	**122,442**
Coastwide Total		**46**	**834,749**	**799,646**

Table 7. 2001 Catch (tons) for food and bait, ZX and ZY, charity, and aquarium use by statistical area

	Area 4	Area 12	Area 13	Area 14	Area 16	Area 17	Area 18	Area 19	Area 29	Total Catch	Allocated
St. of Georgia food & bait lottery				237		644.04				881.04	900
Fjord ZY license						197.39				197.39	200
Walcan ZY license			30.3	140	38	46				254.3	300
Charity						105				105	150
Aquarium						43.66				43.66	110
ZX Personal Use Bait	0.93	6.73	1.81				0.11	0.09		10.57	95
ZY Other Use Bait		1.18	8.39		12.68				0.13	22.38	99
TOTALS	**0.93**	**7.91**	**41.4**	**377**	**50.68**	**1036.09**	**0.11**	**0.09**	**0.13**	**1514.34**	**1854**

Table 8. 2002 Test fishing vessels by category.

# of Vessels	Category	Vessel Names	Region Worked	License Required	Payment Type
3	Management Platform	Lasqueti Star	Central	GN	Seine Fish
		Snow Drift	Gulf	GN	Seine Fish
		Free to Wander	Gulf	GN	Seine Fish
1	Dive Spawn Survey*	Haida Storm	QCI	GN	Seine Fish
4	GN Test / Dive Spawn Survey	Royal Pride	Rupert	GN	Gillnet Fish
		Ocean Explorer	Central	GN	Gillnet and Seine Fish
		Silver Viking	Gulf	GN	Gillnet Fish
		Endurance	Gulf	GN	Gillnet and Seine Fish
3	Surface Spawn Survey	Port Lincoln	Area 12	None	Cash
		Discovery Huntress	Area 13	None	Cash
		Marila	WCVI	GN	Seine Fish
3	Seine Test / Dive Spawn Survey*	Christav	Central	SN	Seine Fish
		Royal Viking	WCVI	SN	Seine Fish
		Viking Joy	WCVI	SN	Seine Fish
10	Seine Test	Queens Reach	QCI	SN	Seine Fish
		Viking Pride	QCI	SN	Seine Fish
		Ocean Venture	Rupert	SN	Seine Fish
		Ocean Horizon	Rupert/WCVI	SN	Seine Fish
		Kynoe	Central	SN	Seine Fish
		Ocean Royal	Gulf/Central	SN	Seine Fish
		Western Ranger	Gulf	SN	Seine Fish
		Royal Mariner	Gulf	SN	Seine Fish
		Bernice C	Gulf	None	Seine Fish
		Pacific Quest	WCVI	SN	Seine Fish
1	Coded Wire Tagging	Ocean Marauder	Gulf / Rupert	None	Seine Fish

* All dive spawn survey vessels supplied 4 WCB approved "occupational scuba" certified divers.

Table 9. 2002 Test fishing vessels, dates of operations, and payment requirements (tons).

Area	Vessel	Captain	Dates	Duration (Days)	Rate	Payment Location	Total (Tons)
2W	Viking Pride	Olsen	Mar 11 - Apr 05	26	3.78	QCI	98.28
2E	Queens Reach	Legate	Feb 27 – Mar 28	30	3.89	QCI	116.70
Dive Platform	Haida Storm	Brillon	Mar 15 – Apr 25	25	3.25	QCI	81.25
Rupert	Ocean Venture	Budden	Mar 11 - Apr 08	29	4.4	Rupert	127.60
Rupert / 27	Ocean Horizon	Ponak	Mar 17 – Apr 08	23	3.99 w/obs	Rupert	144.41
Rupert – GN^	Royal Pride	Malcolm	Mar 06 – Mar 08 Mar 11 – Apr 12 Apr 15 – Apr 25	47	3.85 no obs 2.85 gn 3.2 sn	Rupert	133.95
Central	Kynoc	Wilson	Mar 02 - Mar 31	30	4.17 w/obs	Central	125.10
Central^	Christav	Stava	Mar 09 - Apr 18	41	4.05 no obs 4.3	Central	176.30
Central / Gulf	Ocean Royal	Newman	Mar 10 - Mar 29	20	3.79	Central	75.80
Central	Lasqueti Star	Heskin	Mar 09 - Apr 05	28	2.75	Central	77.00
Central –GN^	Ocean Explorer	Mydske	Mar 15 - Apr 16	33	3.1 gn 3.83 sn	Central	121.82
Gulf	Western Ranger	Dupuis	Feb 22 - Mar 19	26	4.1	Gulf	106.60
Gulf	Royal Mariner	Farac	Feb 24 - Mar 22	27	4.1	Gulf	110.70
Gulf / Central	Ocean Royal	Newman	Feb 24 - Mar 09	14	3.79	Gulf	53.06

Table 9. Continued

Area	Vessel	Captain	Dates	Duration	Rate	Payment Location	Total
Gulf – SN	Bernice C	Melan	Feb 26 - Mar 07	10	1.6	Gulf	16.00
Gulf – SN	Snow Drift	Pierce	Feb 25 - Mar 18	22	2.89	Gulf	63.58
Gulf – GN	Free to Wander	Widsten	Feb 28 – Mar 22	23	2.93	Gulf	67.39
Gulf - GN^	Silver Viking	Wing	Mar 02 – Apr 04	34	3.16 gn	Gulf	107.44
Gulf - GN^	Endurance	Hegglund	Mar 02 – Apr 05	43	3.99 sn 2.9 gn 3.25 sn	Gulf	132.27
CWT	Ocean Marauder	Lenic	Mar 03 – Mar 11 Mar 15 – Apr 05	31	2.99	Gulf	92.69
Area 12	Port Lincoln	Neidrauer		30	$625		$18,750
Area 13	Discovery Huntress	Bunn		30	$625		$18,750
WCVI	Pacific Quest	Logan	Feb 22 - Mar 23	30	3.95	WCVI	118.50
WCVI^	Royal Viking	Holkestad	Feb 26 - Apr 07	41	4.19	WCVI	171.79
WCVI^	Viking Joy	Houston	Feb 26 - Apr 06	40	3.79	WCVI	151.60
27 / PRD	Ocean Horizon	Ponak	Feb 28 – Mar 13	14	3.99 w/obs 3.85 no obs	WCVI	
WCVI Patrol	Marila		Mar 04 – Mar 29	26	1.71	WCVI	44.46

QCI = Queen Charlotte Islands; Rupert = Prince Rupert Division; Central = Central Coast; Gulf = Strait of Georgia; WCVI = West Coast Vancouver Island
^ dive & test

Table 10. 2002 Test fish payment requirements by region, and catch (tons) by location.

Region	Stat. Area	Herring Section	Location	Gear	Catch (tons)	Requirement (tons)
QCI	2E	021	Kat Island Burnaby St	seine	275.871	296.23
Prince Rupert District	5	052	Kitkatla	seine	212.556	405.96
Central Coast	6	067	Kitasu	seine	554.004	576.02
Strait of Georgia	14	142	Upper Baynes Sound	seine	564.733	
	14	141	Cape Lazo (boat ramp)	gillnet	92.138	
	14	143	Parksville Bay	gillnet	71.000	
				Strait of Georgia Total:	**727.871**	**749.72**
WCVI	25	253	Center Island	seine	477.052	486.35
				COASTWIDE TOTALS	**2247.354**	**2514.28**

Figure 1. Herring stock assessment regions in British Columbia

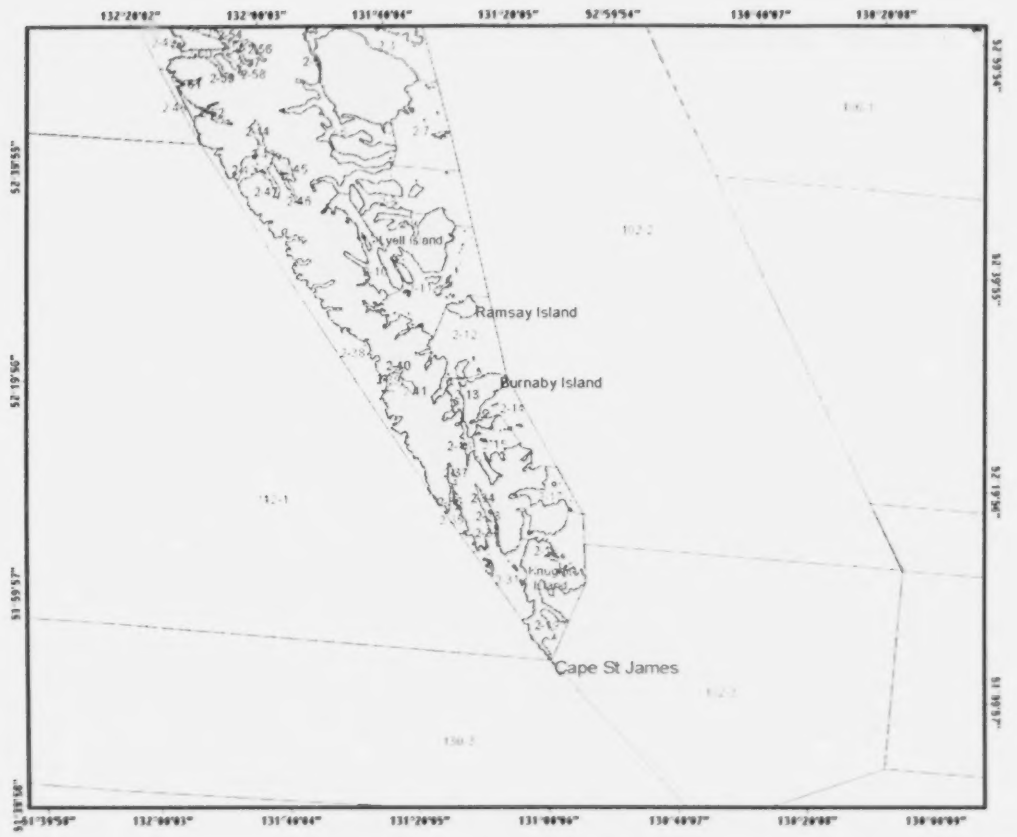

Figure 2. Subareas open for the 2002 Queen Charollet Islands seine fishery: 2-12 and 2-1

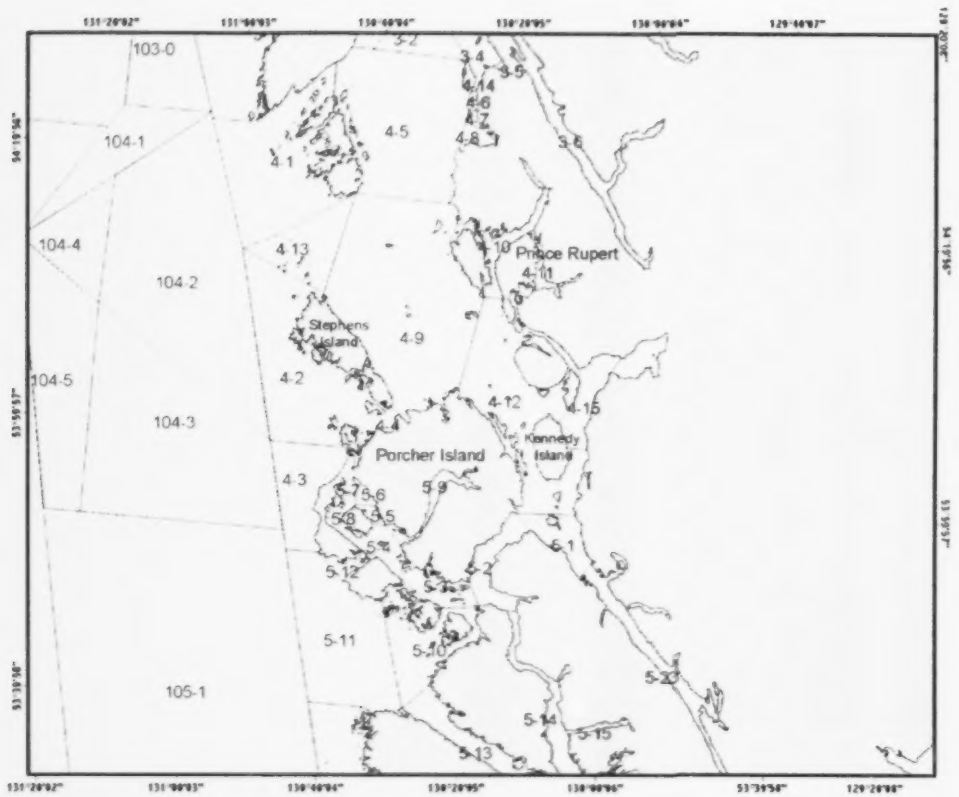

Figure 3. Subareas open for 2002 Prince Rupert seine fishery: 5-10, 5-11 and ptn of 5-4. Subareas open for the 2002 Gillnet fishery: 4-5 to 4-9 and ptn 4-10

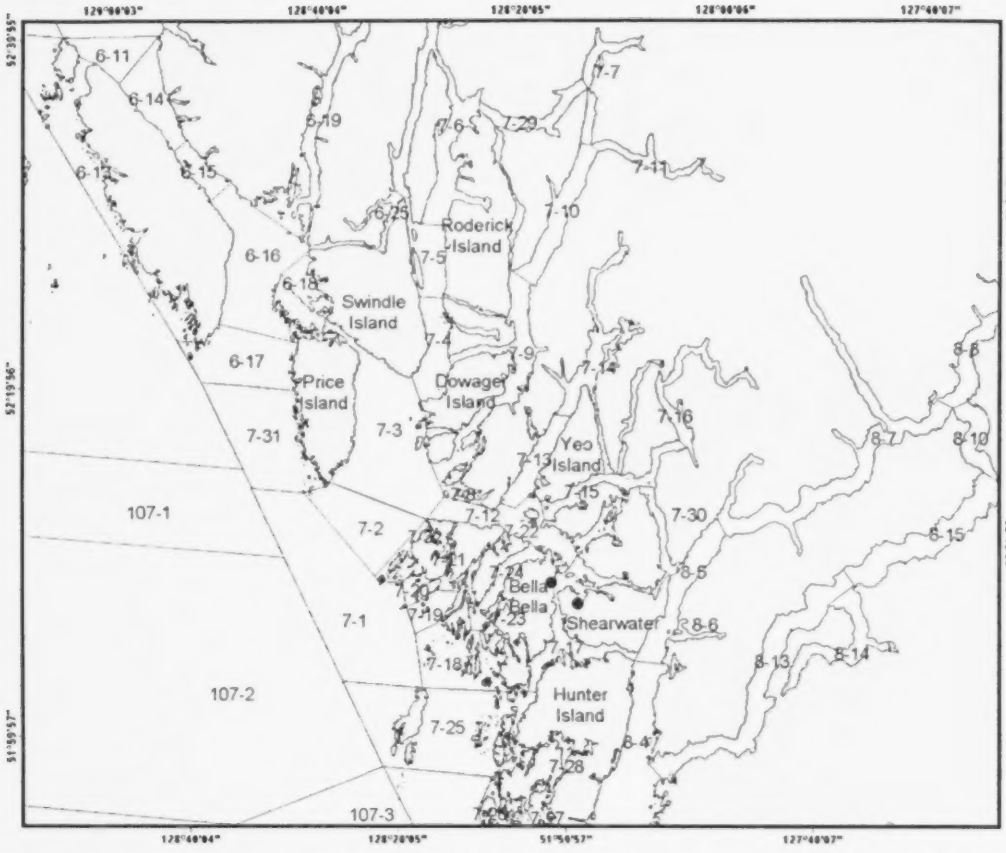

Figure 4. Subareas open for 2002 Central Coast Seine fishery: 7-13, ptns of 7-12 and 7-15. Subareas open for the 2002 gillent fishery: 6-17, ptns of 6-16 and 7-3

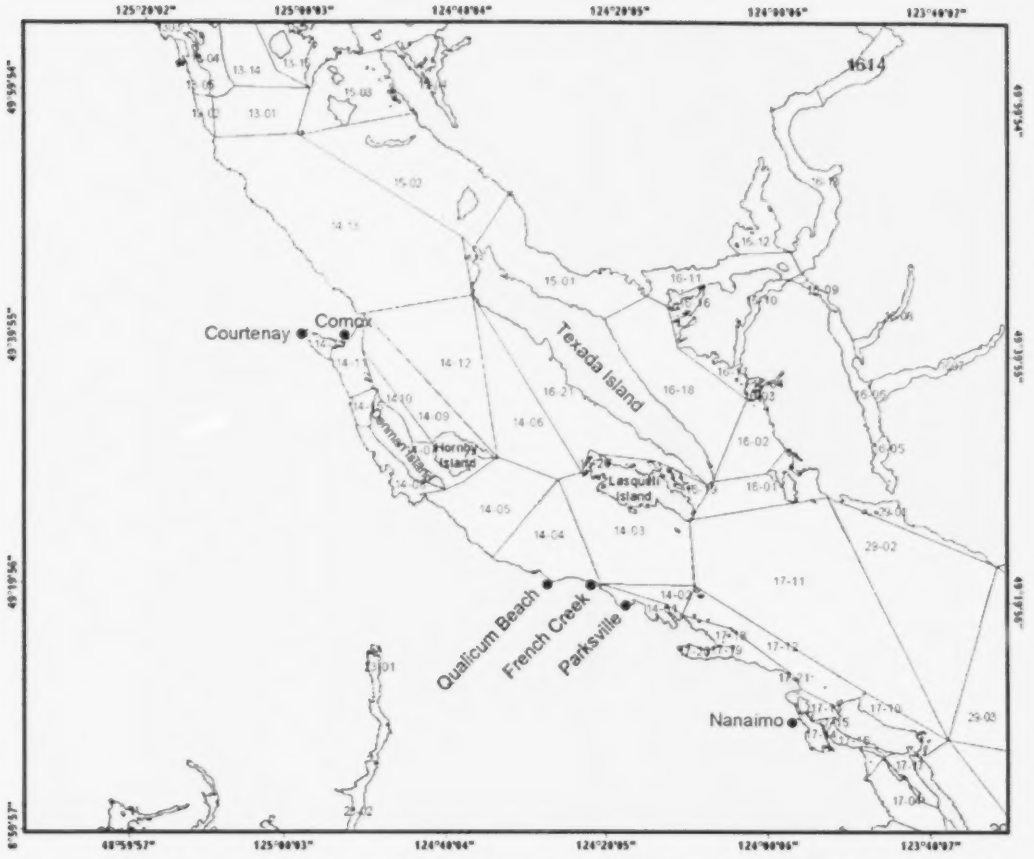

Figure 5. Subareas open for 2002 St. of Georgia seine fishery: 14-11, ptns 14-14 and 14-15. Subareas open for the 2002 gillnet fishery: 14-1 to 14-13, 14-15, 17-12, 17-18, 17-19 and 17-21.

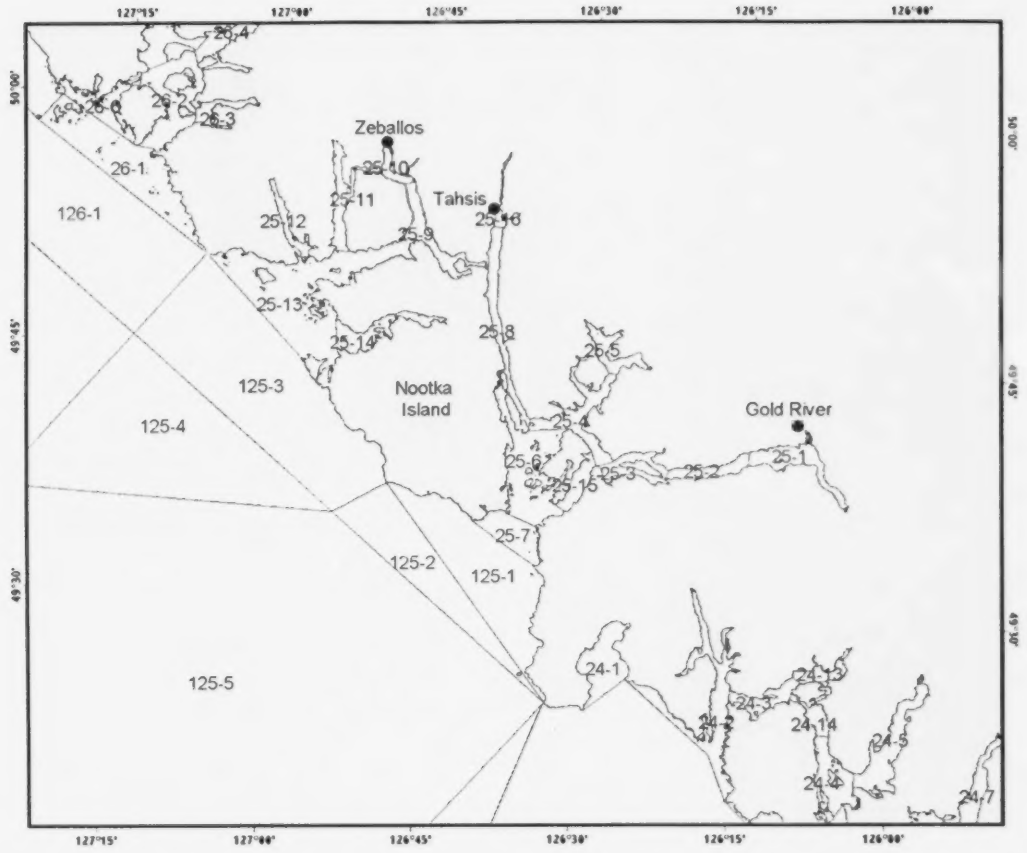

Figure 6. Subareas open for 2002 West Coast Vancouver Island gillnet fishery: 25-13.